MicroMarketplace
BEGINS ON PAGE 54

Southern California's Computer Magazine
Sept. 6, 1993 • #113
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MicroTimes

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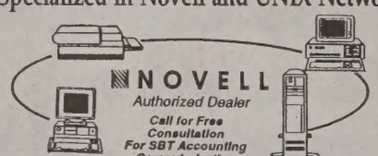

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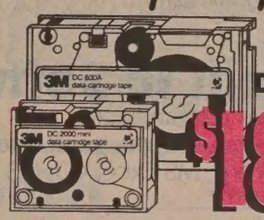

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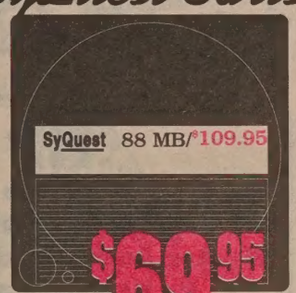

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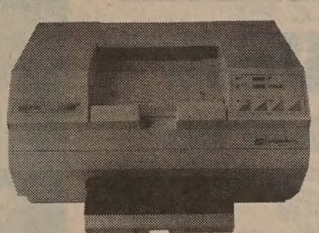

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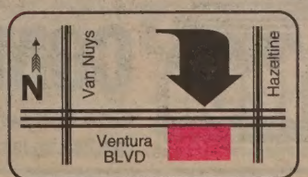

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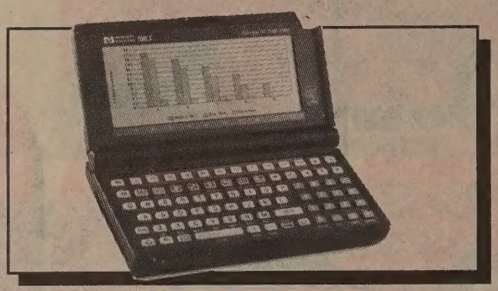

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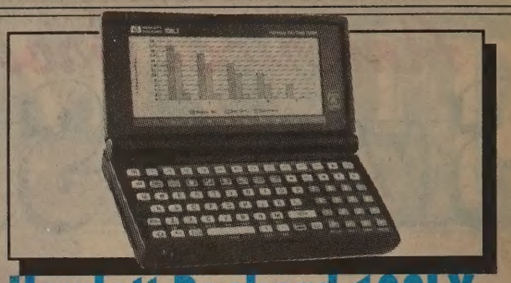

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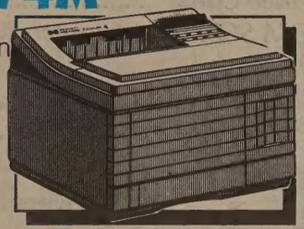

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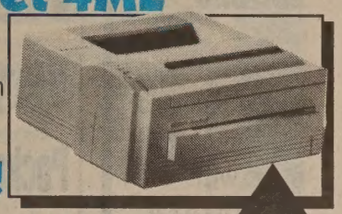

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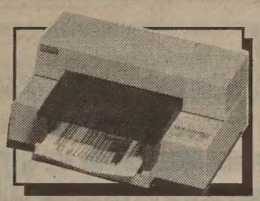

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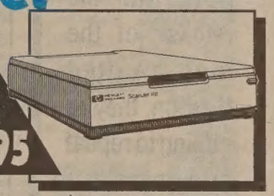

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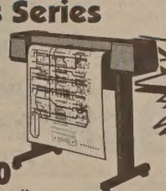

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A NOTE FROM THE EDITORS

Nine years ago, Apple changed computing forever with the Macintosh. Now, with the release of the long-awaited Newton, they're hoping to repeat or surpass that feat with a new tool for even more of the rest of us. We'll be talking about these devices quite a lot in the months to come, and we hope you find this month's visit with some of Newton's creators interesting.

—ME

COVER STORY

Newton: Very Personal Computing

Pocket-Sized MessagePad Adapts To Its Users

By Mary Eisenhart 38

Cover photos: Michael Jay

Apple's Newton MessagePad, which made its long-awaited debut on August 2, promises to change the way people use computers yet again. In this month's cover story, we visit Donna Auguste and Steve Capps of the Newton software team, and examine the current and future state of the technology.

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SGI's latest delivers sophisticated tools for a surprisingly budget-friendly price.

Text: The Ultimate VR Tool?
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In this email interview, *Snow Crash* author Neal Stephenson expresses some surprising views about multimedia, VR, and where it's all going.

MICRO MARKET PLACE

A SPECIAL ADVERTISING SECTION FOR LOS ANGELES AREA COMPUTER BUYERS STARTS ON

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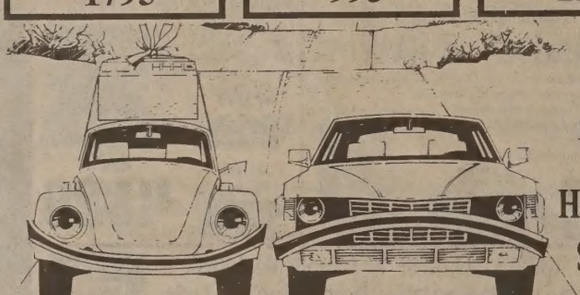

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Dennis Erokan
PUBLISHER
Chuck Stanley
EDITORIAL 510-934-3700
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CONTRIBUTING WRITERS Mikael Blaisdell, Jennifer Robin Cherniss, Anna Couey, Kathleen Creighton, Adam Gaffin, Rich Grace, Peter John Harrison, Fred Lieberman, Woody Liswood, Robert Moskowitz, Kevin Savetz, David A. Simon, CPA, John Wolcott
BBS RESEARCHER David Remus
CONTRIBUTING PHOTOGRAPHERS Jay Blakesberg, Michael Jay, Susana Millman, Ann Summa, Paul Winternitz
ADVERTISING 213-851-8600
DIVISION BUSINESS MANAGER Amy Barrett
SALES MANAGER Cynthia Lapporte (Southern California)
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FOUNDERS
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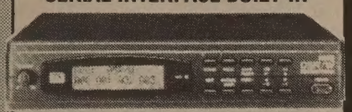

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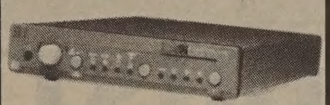

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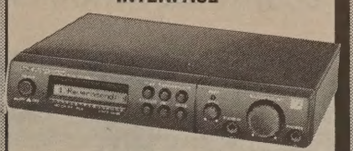

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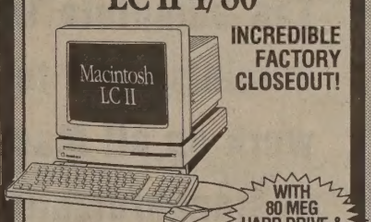

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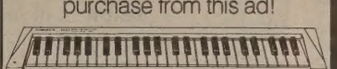

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INDUSTRY INSIGHT

PowerPC To Ship Early; AT&T Merges Eo and Go

BY PAUL HOFFMAN

POWERPCs DUE EARLY FROM APPLE AND IBM

The first computers with PowerPC CPUs will be available at least three months before their previously announced ship dates, much to the surprise and joy of Apple and IBM customers.

Both companies have been successful in the initial design and testing of their PowerPC products and hope to ship in volume within the first three months of 1994. PowerPC is the new RISC CPU designed by the two companies and Motorola; it's gaining a great deal of unexpected support as the two companies publicly demonstrate early versions of the new systems.

The complete set of system enablers allows a system administrator to create a single system folder that will work on all Macintoshes that run system v7.1. This kind of standardization has long been achievable for PCs, but only at the cost of having overly homogenized systems.

The key to the PowerPC's popularity is the large number of operating systems which will be available for it in the near term. Within a year, there will be PowerOpen (the UNIX operating system jointly developed by Apple and IBM), Solaris (the UNIX operating system from Sun Microsystems), IBM's AIX (similar to PowerOpen, but with fewer features), and Apple's System 7 (although most users will be able to run Macintosh software under PowerOpen before System 7 for PowerPC is released). Further in the future, IBM may release OS/2 for PowerPC, and Taligent is creating an advanced object-oriented operating system for PowerPC.

IBM will probably first release a PowerPC system in its RS/6000 line late this year or early next year. That system may run PowerOpen, but may instead run the UNIX with Workplace operating system, based on IBM's own microkernel. Both operating systems are based on IBM's ever-evolving UNIX, AIX. Even if IBM's first PowerPC systems don't run PowerOpen, clearly many later ones will. Each IBM division that uses the PowerPC CPU will probably base its choice of operating system on the demands of its current customers. It is even possible, but unlikely, that IBM will support both operating systems on the same hardware. Only systems that run PowerOpen can run Windows or Macintosh programs, and there will be a high demand for those.

Apple's intentions are much clearer. It has been demonstrating various PowerPC configurations running Macintosh software for many months. The first systems will probably be priced close to the middle to top end of the Macintosh line, and may run about twice as fast as those systems. The systems will probably be announced at the beginning of 1994, possibly at Macworld Expo in San Francisco, and shipped within a few months after that. They will run PowerOpen with Macintosh compatibility from the day they are released, and possibly even Windows 3.1 compatibility by the middle of 1994.

Software companies testing their products on the experimental hardware have reported that they are amazed at how most of their software runs flawlessly on the new systems with no changes, and how fast the code runs. PowerOpen comes with a full translator for 680x0 instructions, and Apple has developed a full implementation of its System 7.1 operating system. Although few of the system calls have been recompiled for the PowerPC, companies report that their programs run as fast or faster on the demo PowerPC boxes than they do on some Quadra systems.

Apple has assured corporate buyers that it will not drop the Motorola 680x0 CPUs immediately, and that software will run the same on both systems. In fact, if current Macintosh software runs so well on the PowerPC systems, Apple may have a hard time convincing smaller software companies to recompile their software for the PowerPC so that their software will run even faster. It is likely that Apple will announce new 680x0 and PowerPCs throughout 1994, leaning more strongly towards the PowerPC line by the end of next year.

The PowerPC chip could get a big boost from the recently rumored collaboration between Microsoft and Motorola. Although nothing has been announced, it is likely that

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the two companies are cooperating on porting Windows NT to the PowerPC CPU. This could be a boon for both companies. If PowerPC is as good as it sounds, having Windows NT available for it could help Microsoft show off NT's abilities better than other RISC processors like the MIPS R4000 and DEC's Alpha. For Motorola, it would be a benefit to have more than one operating system available, so that systems manufacturers who are afraid of being too close to Apple and IBM (but not afraid of Microsoft) would still be interested in the chip.

AT&T MERGES EO, GO

AT&T, which has been buying up major parts of many telecommunications-related companies, has decided to merge two of its early acquisitions into a single company.

Eo, one of the first companies to ship a wireless personal communicator, and Go, maker of a major operating system for such communicators, will merge into a single company. The move was prompted by AT&T, a major shareholder in each company, and was met with some trepidation by competitors of Eo's who rely on the PenPoint system built and sold by Go.

The merger is actually a remerger: Eo spun away from Go a few years ago so that they could make hardware independently from their software parent. Now, both will work together to design both hardware and software, according to AT&T. However, this

Software companies testing their products on the experimental hardware have reported that they are amazed at how most of their software runs flawlessly on the new systems with no changes, and how fast the code runs.

leaves Eo's competitors (who have had even less luck in the pen-based communicator market than Eo) having to buy software from the sister company of a major player. The experience will not be unlike that of companies that manufactured workstations powered by the MIPS CPU after Silicon Graphics bought MIPS. The result may be similar: if an equivalently good operating system comes from another manufacturer, it is likely that Eo's competitors will drop PenPoint and use the new competition instead.

AT&T is probably getting worried about not having any say in what it hopes will be a major market, cellular phones used for computer communication. So far, the market for personal communicators has been almost nonexistent, although Apple's recent release of its Newton line looks like it may stimulate the market. However, AT&T will gain almost nothing from Newton unless they have strategic products that they can license. The Eo, while impressive, has proven too expensive for most buyers, and AT&T could easily end up with another overpriced also-ran computer (remember the 3B series of UNIX computers?) By merg-

Continued on page 98

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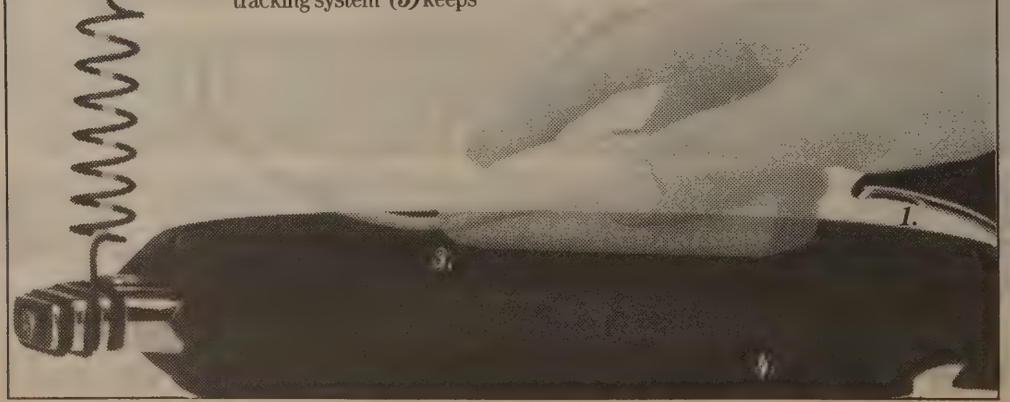

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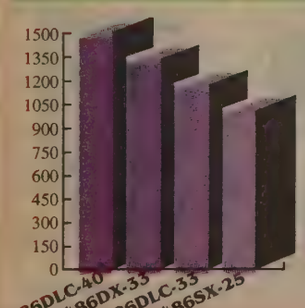

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PC Mag 6.0 Avg. Mix	1470	1339	1215	1002
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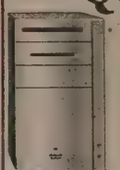

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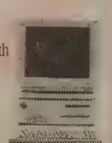

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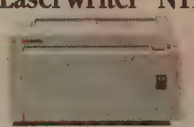

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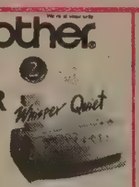

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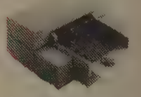

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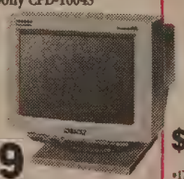

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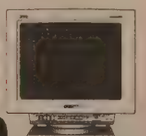

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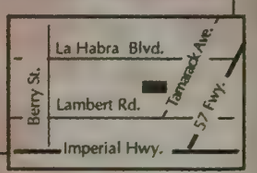


Software Patents SUCK!

BY JIM WARREN

These columns concern building futures—including discussion of construction problems. This one concerns seriously dangerous court interpretations of law that need correction.

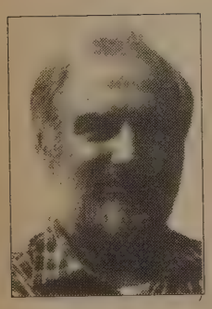
INTENDED FOR "PROGRESS"; NOT FOR CORPORATE MONOPOLIES

The Constitutional basis for patents says: "The Congress shall have the power ... to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries; ..."

Note the purpose: *"To promote the progress of science and the useful arts."*

Software patents do not fulfill that purpose.

Apple's Macintosh was wildly successful long before their unsuccessful—and wastefully expensive—infringement litigation against Microsoft (which made Windows look like the Xerox PARC Alto that the Mac also looked like).



Further, Lotus's 1-2-3 was wildly successful long before their look-'n'-feel litigation lunacy. And some industry observers are *highly* suspicious of possible provincial bias by the Massachusetts judge who benevolently benefited Massachusetts' massive Lotus at the expense of California's tiny Paperback Software (now defunct). [*And, at presstime, of California-based Borland, which also lost against Lotus in the Massachusetts courts.*—eds.] In the process, the judge generated unknown, nonstatutory threats against everyone who implements programs that display data in two-dimensional arrays or use keystrokes to issue commands.

REALIZABLE FANTASIES

SOFTWARE PATENTS ENDANGER PROGRESS

Software has progressed *best* in the *absence* of patent protection. *All* programs are built using previous programmers' designs.

An increasing number of astute software designers are fearfully trying to avoid any appearance of infringing on some twit's obscure software patent—particularly if the twit is a 500-pound gorilla.

If Xerox had bothered to patent and defend the Alto user interface, we probably *still* wouldn't see the great progress resulting from Apple's Mac.

An increasing number of astute software designers are fearfully trying to avoid any appearance of infringing on some twit's obscure software patent—particularly if the twit is a 500-pound gorilla.

E.g., if you are a graphics programmer, you better make sure your programs don't infringe on Tektronix's years of software patents—for which they recently began demanding royalties.

And if you want to use the powerful potential of fuzzy logic, plan on paying royalties to the several Japanese companies that are investing *extensively* in fuzzy-logic research and patenting every wee tiny discovery—that is, *if* they will permit you to use their patented logic, at all.

SMALL IS SCREWED

Patent litigation is wildly consumptive of financial and management resources, and of technical talent as researchers and witnesses. Small companies are little able to initiate patent protection, and *much* less able to defend themselves against infringement claims.

Notice that Lotus didn't first sue Borland in their look-'n'-feel idiocy; Borland had significant financial and legal resources. Instead, Lotus sued itty bitty Paperback Software.

Well-funded thugs are well advised to attack the smallest opponents, least able to defend themselves. Gives the best chance of favorable court precedents at least cost.

That does not "promote progress" for the nation's well-being.

HAVE THEY PATENTED ";" YET?

Even the most careful of designers can't discover if they infringe patents—for *US patent filings remain secret until they are finally granted,* unlike some other nations that disclose upon filing.

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You can have a hot idea; perform diligent, costly, comprehensive patent searches; ascertain that you infringe no patents; pour body, soul and life savings into your program—and then get sucker-punched by a patent that was filed before your patent search, but not granted until after your development investment.

PATENTS PROTECT THE POWERFUL

There is the naive delusion that software patents protect the small innovator from the huge corporation. The instances are the exceptions.

Remember Philo T. Farnsworth? The guy who invented television (at age 28!). He patented it and fought and sued corporate intruders for *years*, and never got a penny from his patents.

Note: IBM holds more software patents than any other US company. For the most part—so far—they just use 'em to badger other patent-holders into royalty-free cross-licenses—hardly helpful to the one-shot innovator.

Corporations are wasting resources building costly arsenals of software patents simply as a defense against other corporations doing the same. When needed, they haul out their trading cards and swap licenses. Hardly helpful to the patent-poor grunt who merely spends his or her time producing great programs.

Big corporations have much more capability, staff, loot, lawyers—and incentive—to patent every comma and semicolon in their programs than do small innovators, and more capability to pursue endless litigation against small opponents.

SUPPORT PROGRESS; NOT MONOPOLY OF LOGIC

To promote progress, it's time for Congress to declare that reason cannot be patented—that national progress is better served by open sharing of problem-solving techniques, not by their monopoly. They should declare that software is like services; not gadgets. (If you invent a great new service, you can't patent it.)

It is time to clearly protect rational beings' ability to use—and share—logical sequences of instructions to solve problems (a service). We *all* build intellectual improvements on ideas of others, in endless permutations and modifications.

Problem-solving services implemented in software should be protected by copyright—and only by copyright, prohibiting direct duplication. However, innovative services implemented as sequences of logical instructions *must not be monopolized.*

Producers who want patent protection can damn well build hardware; patent it—and try to monopolize it. In the meantime, let innovative services for the *rest* of the nation progress—as the Constitution specified.

Had Apple offered the *stellar* Mac operating system as software for numerous platforms—instead of trying to monopolize it in their overpriced boat-anchors—the nation would have more coherent user interfaces ("progress") and Bellevue Billy would probably still be building BASIC interpreters and 2nd-best programs.

DISCLOSURE & DISCLAIMER

As many know, I'm a member of Autodesk, Inc.'s Board of Directors. Autodesk is the nation's sixth-largest software company, first in the CAD market, and has over $400 million in net revenues. It's aggressively patenting its *numerous* software innovations. And, as a shareholders' representative—as much as I *despise and detest* software patents—I support Autodesk's obscene waste of time, money and talent on software patents—for self-defense in the absence of responsible Congressional action to *support* progress.

However, my caustic comments here, are entirely my own and do not necessarily reflect views of the Autodesk Board nor management.

For more, contact Richard Stallman, League for Programming Freedom, Box 9171, Cambridge MA 92139; 617-253-8830; rms@ai.mit.edu.

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Warren founded InfoWorld, *Wireless Digital, Initiative, Inc. and one of the nation's largest public microcomputer conventions. He was founding host of PBS'* Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991) and was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992). He is a member of the Board of Directors of Autodesk, Inc., and writes and speaks widely on issues of telecommunities and government & technology.

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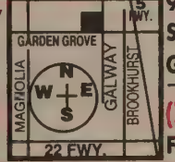

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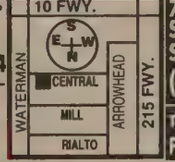

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From The Frontier

A Little Perspective, Please

BY MITCHELL KAPOR

In its December 21, 1992 cover story, headlined, "The playground bullies are learning how to type," *Forbes* perpetuated a dangerous myth. This magazine blamed a new generation of "hacker hoods" for an epidemic of computer crime. It grates on me to see these two words—"hacker" and "hood"—used together.

I'll begin by agreeing that computer crime is a real and serious problem. But the *Forbes* cover seemed to blur the distinction between theft and free speech, between adventuresome teenagers and crooks. Most hackers are just playing around or swapping information; only a minority are out to steal it. Hackers are not hoods, though a few may be.

If I sound sensitive on this point, I have good reason. In the summer of 1990 John Perry Barlow and I founded the Electronic Frontier Foundation to challenge Secret Service seizures of computer bulletin board systems. Our goal was simple enough. We wanted to establish that the Bill of Rights applies in cyberspace as well as on Main Street. We wanted to help assure that law enforcement people, while fighting crime, do not violate the free speech and privacy rights of computer bulletin board users. We made one principle clear from the start: "Unauthorized entry into computer systems is wrong and should be illegal."

Big high-tech rip-offs these days have to do with the theft of cellular and PBX codes, which can run up victims' phone bills into the hundreds of thousands of dollars. According to Donald Delaney, a New York State Police investigator who specializes in this area, major telecom fraud is typically committed by career criminals in their thirties, many of whom see it as more lucrative and safer than the drug business. Hardly your typical hacker.

If the typical seventeen-year-old hacker gets caught stealing small amounts of phone service or breaking into a computer system where he has no business being, he's scared as hell, and ready to confess. He's highly unlikely to do it again. These first-time offenders don't usually end up ever again on the business end of one of Detective Delaney's warrants. There is no reason for bringing the full force of the law down on kids like this.

So I was peeved at a *Forbes* cover that seemed to lump these kid pranksters in with hardened crooks. Such broad bracketing leads to excesses like those of the Secret Service in the recently decided Steve Jackson Games case. Federal Judge Sam Sparks found that the Secret Service illegally seized the private electronic mail of users of a customer relations bulletin board system operated by the Jackson firm.

At the trial, Judge Sparks roasted Secret Service agent Tim Foley for not making a simple investigation in advance that would have shown there was no cause to snoop on email. The case demonstrates that accusations of computer crimes should be limited to cases involving seriously harmful behavior and injurious intent, not the mere suspicious use of a computer or a network.

CASE HISTORY: MASSACHUSETTS

In Massachusetts, efforts to put such a balanced perspective into law are now underway. Governor William Weld has submitted computer crime legislation based on a report of his Commission on Computer Technology & Law, which I chaired. Commission members included law enforcement officials, such as a bulletin board system-literate district attorney, representatives from the computer and telecommunications industries, and civil libertarians.

The commission determined that much of what is labeled "computer crime" would constitute a crime regardless of the particular means of accomplishment. Theft of a lot of money funds through manipulation of computer accounts is grand theft. Does the computer make it any grander?

Our commission reported, and Governor Weld agreed, that changes to the law, where needed to plug gaps, are best accomplished by modifying existing law and building off familiar legal principles, not by passing overly broad and untested laws specifically covering computer crime.

The Massachusetts experience shows that it's possible for civil libertarians, law enforcers, and industry experts to find common ground; they can address problems created by the spread of computers without compromising rights. This is the story the media ought to pay more attention to. Enough of these fantasies about dangerous teenagers stealing big money and compromising national security.

We found, for instance, that unauthorized access to a computer system is not, by itself, a violation of Massachusetts law. It should be. We therefore recommended an addition to the criminal law covering electronic trespass with penalties of up to $1,000 in fines or thirty days in jail. The proposed statute states that the requirement of a password constitutes the equivalent of a posted "No Trespassing" sign.

The Massachusetts experience shows that it's possible for civil libertarians, law enforcers, and industry experts to find common ground; they can address problems created by the spread of computers without compromising rights. This is the story the media ought to pay more attention to. Enough of these fantasies about dangerous teenagers stealing big money and compromising national security. ■

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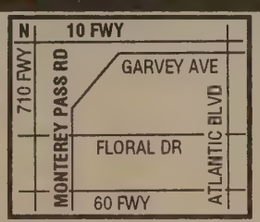

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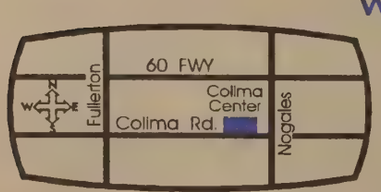

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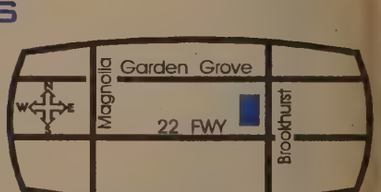

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Between the palmtop and the notebook lies the category of the subnotebook: machines usually around three to four pounds, with full-sized screens and keyboards that you can touch-type on, but a few pounds lighter and a few inches smaller than the typical notebook computer. Hewlett-Packard recently entered the subnotebook competition with the introduction of its Omnibook 300, a powerful yet (relatively) lightweight machine.

Some have suggested, however, that there is yet another category of machine between the palmtop and the subnotebook: the sub-subnotebook, larger than a palmtop, but still light enough to feel super-portable.

The $795 Bicom B280i is a very good example of this category. At 6.3" x 8.9" x 1.2", it's too large to fit in a small pocket; however, as small as a typical hardcover book. Weighing just 2.2lbs., it's a lot lighter than the HP Omnibook or similar subnotebooks, yet it houses a 60MB hard disk, 2MB of RAM, and a 286 processor running at 16 MHz. (A newer unit based on the 386SL processor is apparently the next in the series, but was not available at the time of this review.)

The difference between a 4lb. subnotebook and a 2.2lb. sub-subnotebook doesn't seem like much, but it really is quite noticeable. Whereas the HP Omnibook 300 looks and feels like a notebook computer, the Bicom seems almost too small and light—you open it and half expect it to be just a toy computer, or even a calculator. But no, the Bicom is capable enough to run Windows 3.1, and this is just an example of a growing number of machines that will continually increase in power to match that of the notebook and the desktop machine.

The display is an enhanced CGA-compatible with a resolution of 640 x 400 pixels at 16 levels of greyscale. Windows 3.0 and 3.1 display drivers are provided (though you must purchase and install Windows itself separately), and DR-DOS 5.0 comes installed. The unit is powered by five 1.5 V AA batteries, and comes with nickel metal hydride rechargeables.

In addition to DR-DOS, the unit ships with file transfer software, allowing you to transfer files to and from your desktop PC using the supplied cable (therefore it is not necessary to purchase the optional external floppy drive unit). A PCMCIA 2.0 Type I slot is provided, allowing you to add fax modems, Ethernet cards, or more memory to the unit. The keyboard is quite usable and one can indeed touch-type on it, though the function keys require that you use a special "Fn" shift button (since they are sharing the numeric keys at the top of the keyboard). This isn't a problem for many users, but if you're a WordPerfect user it could be quite inconvenient.

The B280i ships with a small amount of built-in organizer functionality, including simple clock/calendar, scheduler, world time, memo, alarm clock, and financial calculator functions. It also comes with a graphical file manager called Viewmax. An external floppy drive is available for $195.

The built-in organizer software is not particularly powerful and is somewhat clumsy to use—far less powerful than that provided even in a low-end Sharp or Casio organizer. For example, the calendar function displays schedule items with a little dot next to the date (like the Sharp or the Casio), but you cannot jump to the schedule items using the Enter key, as you can in other, better-designed, organizers. However, it does provide minimal functionality, and as a bonus it uses a built-in 256K of nonvolatile RAM, and thus it doesn't use up the battery with unnecessary hard disk access. A file conversion utility is also provided to export the format to SideKick or dBASE.

The battery situation is somewhat disappointing. Though Bicom claims up to three hours of continuous use on a full charge, the salesperson at a store I recently visited said that in their experience typical battery life was only one to two hours of solid use. The Bicom does come with a number of power management options, however, and if you were to install a Flash Disk card and use it for your primary storage instead of the internal hard disk, you could also extend battery life considerably.

Another battery-related problem is that the charger has no autosensing facility to turn it off when the batteries are fully charged. Nickel metal hydride rechargeable batteries can get damaged if overcharged, so this is something of an oversight in the design. However, these design tradeoffs were probably made to keep the overall weight of the unit as low as possible.

Despite the drawbacks, if I wanted to take a computer with me while travelling I would seriously consider this machine. Though underpowered compared to a full-sized notebook or desktop computer, it is quite usable for basic telecommunications, word processing, and even simple spreadsheet computations. Its low weight and unobtrusiveness make it ideal for those who like to travel light, yet it is powerful enough to handle many everyday computing chores, including the ability to run real Windows applications. After all, it wasn't too long ago that the specifications of this machine would have made a more than adequate desktop computer.

I have had some difficulty contacting the manufacturer of the machine, however, indicating that phone support might be lacking or even nonexistent. One can only expect, however, that as this class of

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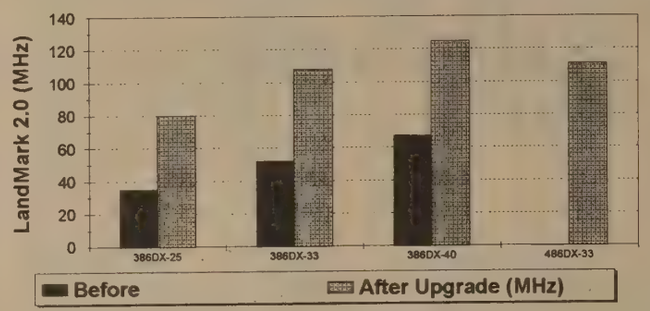

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machines gets increasingly powerful, we will see a proliferation of similar sub-subnotebooks in this category. Flash RAM and other low-power substitutes for hard disks will also increase battery life and reduce weight. HP is already offering its Omnibook with a Flash RAM option, which dramatically increases usable battery life.

Docking The HP 95LX

A number of notebook and laptop computers are now coming with docking stations, allowing the user to quickly attach and detach desktop peripherals.

Sparcom has a series of docking stations for the HP 95LX series palmtops. The SmartDock ComStation comes with a built-in 2400 baud fax modem, serial port, parallel port, fax software, email software, file transfer software (runs under Windows or DOS), cables, and other connectivity utilities for $399.95 retail.

Also from Sparcom is the Drive95, an external 3.5" floppy drive for the HP 95LX. For $329.95, the unit comes with device drivers, an intelligent cache to minimize power consumption, built-in rechargeable batteries, and up to fifteen hours of continuous operation on a charge. The unit attaches to the 95LX via the serial cable.

IBM Gets Small and Wireless

IBM Technology Products has announced an infrared wireless PCMCIA adapter and two PCMCIA fax/modem cards. The infrared adapters work with standalone wireless LANs based on the Novell ODI protocol. The adapters communicate at 1Mbit per second (approximately one tenth the speed of Ethernet). The connections use diffuse infrared, which means that they do not have to be in a straight line-of-sight with each other (i.e. they do not have to be aimed directly at each other). According to IBM, 100% coverage can be achieved in rooms measuring up to 30 x 30 feet. The PCMCIA adapter is $549 and the ISA adapter is $499. The modem cards include 2400/9600 baud and 14.4/14.4 kbps fax modems, and cost $299 and $499, respectively.

AMD Supports Xircom

Meanwhile, Advanced Micro Devices has announced support for the Xircom Netwave wireless LAN standard based on radio LAN adapters. Netwave allows the formation of peer-to-peer workgroup LANs, and AMD hopes that the promotion of the Xircom standard will allow users to mix and match wireless LAN products much as they can Ethernet and modem products. Other partners include AST Research, Dell, Digital Equipment Corporation, GEC Plessey, NCR, NEC, Norand, Novell, Sun Microsystems, and Telxon.

PCMCIA Cellular Modem

AT&T Paradyne and Nokia Mobile Phones have announced a PCMCIA Type II modem with a special direct connection interface that allows users to connect the 14.4 kbps modem to a Nokia Mobile Phone. Special error correction designed for cellular use by AT&T Paradyne is built into the modem. The

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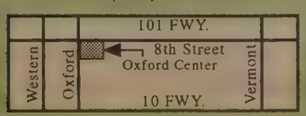

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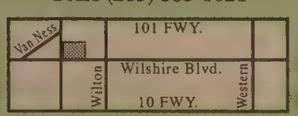

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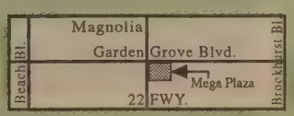

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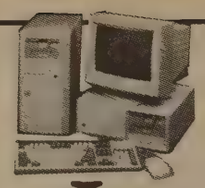

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design does not require an external battery, since the mechanism is powered by the mobile phone and the computer's power supply. Price is $699 for modem and interface (not including the phone).

Air Mail

Most existing wireless connectivity solutions involve expensive use of cellular voice lines for regular modem link-ups. The disadvantage of this approach is that depending on how you use the network, you might unknowingly rack up very high charges on your cellular telephone bill. What wireless communications needs is a fixed-rate service, so you can communicate without worrying about the cost of every character you send and receive.

RadioMail is such a service. For a flat rate of $89, you get unlimited two-way electronic mail, with routers to Internet, CompuServe, MCI mail networks, cc:Mail, and ATT Mail. The service uses the Ericsson GE "Mobitex" wireless data network in the US and Canada, with a data transmission speed of 8 kbps, supporting 90% of urban business areas. RadioMail consists of special applications software, and it supports a wide range of cellular data packet modems, such as the $795 Ericsson/GE Mobidem. The HP 95LX and 100LX are supported, as are Apple PowerBooks, Duos, and any DOS laptop or notebook computer. RadioMail also provides one-way forwarding of messages to a variety of paging devices.

Another wireless messaging service has been announced by Motorola, Inc., called EMBARC. EMBARC (Electronic Mail Broadcast to A Roaming Computer) is a one-way service that allows both one-to-one and one-to-many (broadcast) transmissions. The system utilizes the NewsStream receivers, which use paging technology to receive news and information while on the go. Messages can be up to fifteen hundred characters of text or binary data. In addition to messaging, the service also delivers daily news and weather reports from *USA Today* as well as other information services for the $15 monthly subscription fee. More extensive news headline service is available via the optional HeadsUp service, which costs $30/month, and allows users to request the full text of news articles by calling a 1-800 number and punching in the six-digit code. The text can be faxed or sent to their EMBARC mailbox. Supported platforms include the HP 95LX and 100LX, as well as the PowerBook line and DOS portables. Service is available in the United States and Canada.

The Incredible Shrinking Hard Disk

Western Digital has announced its own PCMCIA Type III form factor micro hard disk drive, the Caviar Ultralite CU140, with a 19ms seek time and 1.8" size. The HP Omnibook 300, mentioned earlier, uses this drive as its default (the other option is a Flash RAM drive). The drive provides 42MB of disk storage, but uses a very small amount of power.

More PCMCIA Cards

DataTrek Corporation has announced its own high-speed PCMCIA fax modem and Ethernet card. The DataTrek ComCard-2 is a 14.4 kbps v.32bis fax modem that lists for $565.

DataTrek also has announced the NetCard-T and NetCard-2 Ethernet cards, which list for $345 each. Interestingly, these Ethernet cards are fully NE2000 compatible, meaning that one can use any driver that can be used with the popular Novell NE2000 Ethernet board. This gives the DataTrek Ethernet cards a slight advantage over other cards, since one can almost be assured that drivers will be available even as new versions of operating systems come into being. ■

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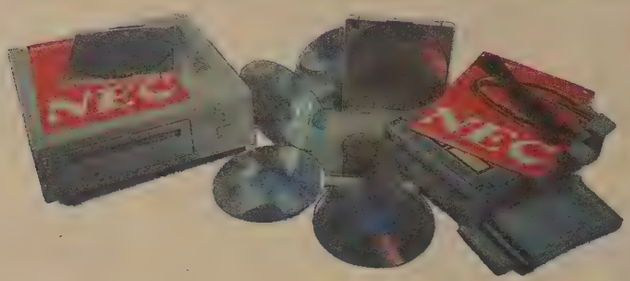

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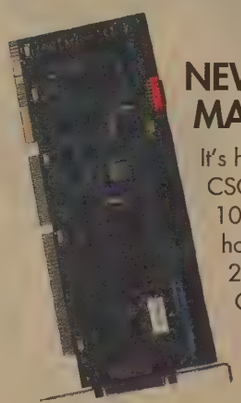

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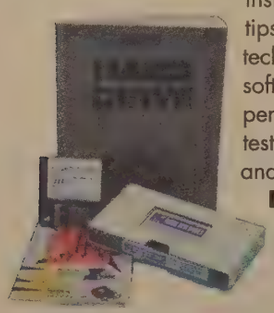

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Telework Think Tank

New Institute Collecting The Hard Data To Help Evaluate And Better Understand Telework

BY ROBERT MOSKOWITZ

Founded in 1990 by Charles Grantham and Larry Nichols, the Institute for the Study of Distributed Work is a research facility, think tank, and consulting company based in Oakland, CA, and dedicated to supporting the advance of various forms of telework into the 21st Century. Grantham and Nichols began as social scientists and organizational development consultants for major corporations. But over the years, they grew tired of the relative scarcity of accurate research information on topics related to telework, and established the Institute as a mechanism for gathering and disseminating hard data on their own.

Ever since, the Institute has kept busy performing and replicating studies and gathering data that will satisfy the most hard-nosed economist. "There's too much anecdotal data being thrown around," says Grantham. "It's valuable, but it's only the first step. I don't know about anyone else, but I for one don't want to set national labor policy for telecommuting—or anything else—based on anecdotes and hearsay."

> "We've found that supervisors tend to measure a telecommuter's productivity in terms of the quantity of output, while the telecommuters themselves tend to focus on the quality of their output rather than the quantity."
>
> ——Charles Grantham, Institute for the Study of Distributed Work

For example, Grantham disputes the accuracy of some estimates of how many people are active telecommuters. "It's very difficult to track telecommuters through data that originates with employers," he points out, "because so many of these people are what I call 'guerrilla telecommuters'—employees just telecommuting informally without their employer's human resource department knowing anything about the details of the arrangements, or in some cases even that the telecommuting arrangements exist."

Grantham also warns that figures cited for telecommuting-related increases in productivity are not always what they seem. "You have to be careful about how you define it," he says. "We've found that supervisors tend to measure a telecommuter's productivity in terms of the quantity of output, while the telecommuters themselves tend to focus on the quality of their output rather than the quantity."

Grantham's latest numbers show that about 3% of the white collar workforce in California are already telecommuters, and that this proportion may go to about 12% or even 15% within the next seven years. "Given the speed at which we're moving to a global economy," Grantham muses, "it's only natural that people with globally useful skills will embrace telecommuting. In fact, our research shows that people are likely to move from one community to another in search of a better place from which to telecommute."

Grantham has a vision of a global economy peopled by what he calls "untethered workers," employees who use laptop computers and portable phones to stay in touch with the office and their colleagues from their home, a park bench, or even the beach. In his view, we are rapidly evolving toward a "digital workplace" in which members of a workplace team can collaborate effectively from virtually any place in the world.

In today's world, however, the Institute for the Study of Distributed Work is still building the case for such a transformation. The highly regarded Institute regularly fields a squad of eager graduate students and seasoned researchers who do extensive interviewing and digging through existing data to find reliable information on telecommuting and other forms of telework. These data are the basis for the Institute's steady stream of technical publications and strategic presentations to such international audiences as the Global Village International Symposium (Vienna, Austria); Senior Managers from Beijing, China; the Silicon Valley Advanced Management Training Center (Fremont, CA); the Association for Management of Organizational Design (Philadelphia, PA); and the Bay Area Telecommuting Conference.

Grantham and his researchers are presently organizing a San Francisco-area conference for September 22, 1993, at which they plan to reveal the results of a major study of how telecommuting impacts both families and the communities in which telecommuters work. This AT&T-supported study was conducted in California's Contra Costa County over a period of more than eight months. Although at this early date Grantham will not leak any specific data or findings of the study, he promises "the results are very positive in terms of showing reduced stress and improved quality of life" for the telecommuters.

But the Institute studies more than just the favorable aspects of telecommuting. Grantham and his colleagues are equally concerned with what he terms the "shadow" side of this work phenomenon. These adverse psychological effects of telecommuting include worker isolation, jealousy on the part of non-teleworkers, and various unresolved legal issues, such as

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taxes—since under certain points of view it's possible for the "benefits" of telecommuting to be considered taxable income on which the employee may ultimately owe the IRS its share. Other concerns that will require more attention include health coverage, disability insurance, and even workers compensation.

"The first time a telecommuter sues his or her employer for an on-the-job injury," says Grantham, "you're going to see a massive reaction against the kind of indecision and waffling we've had from legislatures on these issues."

But Grantham feels these relatively technical, legal issues can be resolved without too much trouble, and he's hopeful they will be within the next few years. The reason? His research shows that large numbers of highly skilled professionals are highly motivated to become telecommuters. Since large-scale employers cannot prudently embrace telecommuting for meaningful numbers of workers until many of these legal and technical issues are settled, the pressure to resolve these matters is already building up to irresistible dimensions. "A hopeful sign that no one can deny," says Grantham, "is that the impetus for change toward telecommuting is coming up from the ranks rather than down from top management."

The latest numbers show that about 3% of the white collar workforce in California are already telecommuters, and that this proportion may go to about 12% or even 15% within the next seven years.

In its first three years of operation, the Institute has already compiled evidence to demonstrate a whole range of benefits that flow from telecommuting to the workers, their employers, and the community. Briefly, this list includes such items as:

- Quantifiable cost savings for each and every telecommuter—For example, one-time training costs average about $50 per telecommuter. Communication costs average about $50 per month per telecommuter. However, by staying home to work one day per week, a telecommuter who would normally work in a 10' x 10' cubicle frees up from $500 to $1000 worth of office space and associated overhead during the course of a year. In addition, a 10% productivity gain by a telecommuter earning $30,000 per year is worth $3000 per year. Clearly, the numbers weigh heavily in favor of telecommuting.

- Steadily decreasing needs for office space as telecommuting becomes an established mode of working—Organizations that are crowded for space today can reduce this burden tomorrow by authorizing people to start telecommuting. As a practical matter, many organizations that are already telecommuting do not benefit much from having their offices relatively thinly populated, because existing lease or ownership arrangements minimize the bottom-line impact of this new trend. However, as firms build recognition of telecommuting into their plans for office space in the future, significant cost savings will be realized.

- Closer and stronger ties between a telecommuting worker and his or her family—The telecommuter immediately gains additional time to spend at home and in the community, simply by eliminating thirty to sixty minutes per day, or more, in commuting time. Regardless of how the telecommuter uses this time, they almost universally perceive it to be an important benefit.

- Easier entry into the workforce by disabled workers and single parents—Telecommuting provides a means to help certain classes of workers not only support

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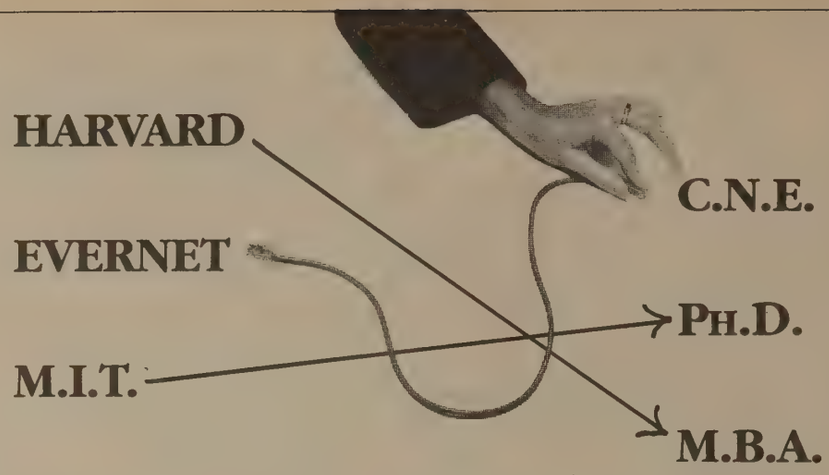

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themselves and contribute to the support of their families, but also become vital, productive members of society.

But while pleased that telecommuting offers important incentives and advantages, Grantham is equally concerned about the hidden restraint on telecommuting contained in what he calls "the inhibitory urges of first-line management." From his point of view, the strength of this phenomenon is vastly underestimated, and is probably the major reason that telecommuting has not become more popular than it is.

While these positive and negative forces play themselves out in the workplace, the Institute continues to study in detail more aspects on the cutting edge of the telecommuting movement. Some of its most recent projects include:

• The study in Contra Costa County, supported by AT&T, designed to put hard numbers on the family and community impact of telecommuting. Results will be released at a conference in San Francisco on September 22, and will be reported here as soon as possible.

• A separate study to quantify the impact of telecommuting on individual and corporate productivity. Grantham says he finds a reliable 15% increase in productivity among telecommuters, as measured by both workers and their managers. The figure appears to apply "across the board," he says, with statistically significant levels of agreement and very little variance from one firm to another, from one job classification to another.

• Still in progress at the Institute is a design project, funded by CalTrans, to determine the requirements of a telecommuting center that will meet the broadest range of employee, employer, and community needs. Grantham believes that a successful telecommuting center will not only provide a good place to work, but will also house programs and facilities for educating the community about the opportunities to telecommute, and for fostering closer connections between the community and the telecommuting center itself. For example, successful telecommuting centers of the future may contain equipment that gives ordinary citizens direct access to local government services, directories of officials, on-screen application forms, and much more. It's already clear that these telecommuting centers should be strategically located within the public transportation network so people can travel to it by bus, bike, foot, and other non polluting ways. "If you have to use the freeway to go telecommuting," says Grantham, "you're throwing away

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Dataproducts Takes Networking a Step Farther with VPT

The concept of the network printer has evolved a step farther with the introduction of two new printers that offer what Dataproducts calls "Virtual Printer Technology." The new machines the LZR1580 and LZR 2080, are similar to Dataproducts' LZR 1560 which uses Fuji Xerox engine and Weitek-based controller. But Dataproducts' VPT technology gives the LZR 1580 and LZR 2080 important network capabilities that are unmatched by competitive products.

To accommodate the higher resolution of the 1580 and 2080, Dataproducts has also changed the memory configuration of the new controller. Instead of 4 MB of standard RAM that can be upgraded to 16 MB, the implementation in the 1560, the new printers have 8 MB of standard RAM that can be upgraded to a maximum of 32 MB using three slots for 4 MB and 8 MB proprietary Dataproducts memory boards.

VPT GOALS

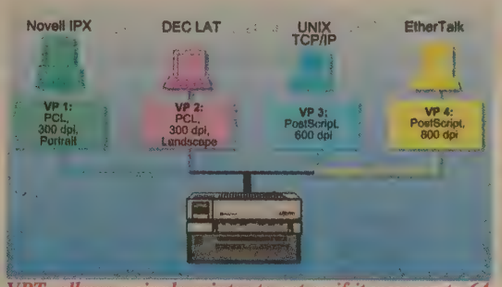
The most important new feature of the 1580 and 2080 is "Virtual Printer Technology, " an umbrella term that covers an assortment of new hardware and software networking technology developed by Dataproducts and third-party partners. With VPT Dataproducts has matched the network capabilities of rivals like HP and Compaq, and indeed catapulted to leadership.

VPT, which has been in development for two years, refers to the specific networking capabilities of the 1580 and 2080, but also to a larger conceptual scheme for network printing that is only partly realized by the 1580 and 2080. According to Dataproducts Director of Strategic Marketing and Planning, Allen Russ, VPT is a whole new approach to network printing. "We didn't just take an existing printer and add a network card," says Russ. " We set up a separate engineering group, looked at a host of operating systems, and tried to come up with a way to integrate printers into an enterprise network."

Dataproducts had designed VPT to support multiple concurrent network protocols and to offer back-channel feedback on the status of the printer. Dataproducts also wanted VPT to address tougher network printing issues. One of the firm's goals was to offer network printer users the same flexibility that is available to personal printer users. According to Russ, individual users need and want the ability to configure a printer in their own way. Users want their network printer to store indefinitely all the resources (fonts, forms, logos, etc.) they download to the machine rather than flushing that data every time another user sends down a print job or switches the printer's emulation mode.

At the same time Dataproducts wanted to insure that its virtual printer technology was administrator-friendly, a goal that is tough to reconcile with user flexibility. Dataproducts engineers needed to figure out a way to insure the varied services offered to users were transparent to each other and to the system administrator.

Another design goal for Dataproducts was to make VPT transparent to the host system, so that VPT printers could be installed without updating or replacing any system software. Plus engineers incorporated other administrator-friendly features including SNMP support, a robust and automatic error recovery that does not require powering down the printer, and remote console capability that enables remote users or administrators to control every feature of the printer. Additionally, they designed "investment protection," a thorough software upgradability.



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LZR (TM) 1580 and LZR 2080 Enterprise Laser Printers .

"VIRTUAL PRINTERS"

In essence, a VPT printer is designed to appear to users and to their software as a series of "virtual" printers, each of which can be configured differently. When a Dataproducts VPT printer receives data addressed to a particular virtual printer, it switches to the configuration that has been assigned to that virtual printer.

VIRTUAL PRINTERS

The concept that Dataproducts developed to address this complex and seemingly irreconcilable array of issues was surprisingly simple though elegant:

The virtual printer idea allows a system administrator to configure a VPT printer the way each individual user wants it without interfering with other users' interaction with the machine. And virtual printers are transparent to the host software-no special codes or commands must be sent to the VPT printer. The host software addresses a particular virtual printer just as it would a real printer.

Dataproducts VPT is essentially a greatly-elaborated version of LaserTool's' virtual ports. Instead of two virtual ports or printers, the VPT architecture implements a full 64. Dataproducts' VPT associates all of the printer's user configurable parameters,including network protocol, printer language, resolution, paper size, print orientation, default font size, and many others. Dataproducts also allows the assignment of priority to the virtual printers that determines which prints first.

Dataproducts arrived at the figure of 64 (virtual printers capacity per machine) after talking with customers and analyzing their situations. The firm concluded that 32 virtual printers would be enough, but then decided to double the figure just in case so that VPT will be as flexible as possible.

REMOTE CONSOLE

A system administrator establishes the configurations for the virtual printers using "remote console" firmware built into the printer. According to Russ, the remote console set-up procedure is quick and easy. An administrator simply logs onto the printer from a terminal and runs the set-up procedure, which has been designed with a user interface that matches the appropriate operating environment. The terminal can be connected directly to the printer using its serial port, or can communicate with the machine over the network.

At the moment, Dataproducts has developed only DEC and UNIX remote console firmware for the LZR 1580 and 2080, bur it is working on Windows and Macintosh firmware that should ship in the first quarter of 1994. For now, PC and Mac users can configure a VPT by using a third party DEC or UNIX terminal program.

MORE TO COME

The most important features of VPT yet to be implemented are resource accounting and context saving. These capabilities are available on a few other network printers, but no vendor offers an implementation as robust as that proposed by Dataproducts. The key to this robustness, of course, is the virtual printer architecture: both features will be implemented so that they function independently for each virtual printer.

The VPT resource accounting feature will track total images printed (a duplex page has two images), and total print job bytes, all by individual users.....

PRICING STRATEGY

The LZR 1580 and 2080 started shipping on June 25. The 1580 will be offered in two and three-bin configurations, while the 2080 will be available in one-. two-, and three-bin configurations. Pricing ranges from $4,595 for a two-bin 1580 to $5,495 for a three-bin 2080. In addition, Dataproducts will offer stripped down models of the 1580 that have only 4 MB rather then 8 MB on their motherboards and do not VPT higher resolution capability, or an Ethernet interface.

For more information about VPT call Data Systems Service Corp. @ 800/ 272-3772

WHAT THE EXPERTS SAY...

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Paula Bursley
Senior Analyst, DataQuest

" Dataproducts announced a pair of true-800-dpi printers that take the concept of 'network ready' to a new level."
The Seybold Report on Desktop Publishing

"VPT turns a network printer into a consummate politician, showing whatever ace each user wants to see."
LAN Times

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some of the benefits that made CalTrans supportive of telecommuting in the first place."

• A comparison of telecommuting in large and small organizations. The results showed that telecommuting tends to be a relatively informal affair among organizations with fewer than one hundred employees: a large number of people are simply taking the account books home at the end of the month, or staying home to accomplish other projects that would be more difficult to complete in the office. Many of these telecommuters don't even know what to call the arrangement, but are nevertheless successful at making them work out well. "The management of teleworkers in the small business segment," Grantham observes, "just doesn't seem to pose the same problems and restraints that it does in large corporations, probably due to nothing more than the difference in sizes."

• Grantham is looking forward to his next project, a comprehensive international study on what he calls the "untethered worker." Grantham and his colleagues have identified "a couple of hundred" people who are working for companies across state or national borders, using electronic communications technology to maintain close enough ties to build long-term relationships and to remain effective members of the team. Says Grantham: "I want to know what is required of employees and employers to successfully support this kind of employment."

Grantham speculates that telecom-muting may reach the "take off" stage (at which it begins to proliferate very quickly) somewhat sooner in Europe than the US, if only because the European Economic Community is aggressively standardizing wage rates, benefits, and job categories so people can more easily telecommute across borders there. In addition, the investment in the most modern forms of electronic communications infrastructure is proceeding much faster there than in this country. Grantham reports that in Budapest, for example, the laying of fiber optic cable to link outlying villages with the capital is well underway, and indeed enjoys a much higher priority than such basic elements of infrastructure as sewage treatment plants. "The US communications environment is still hamstrung by monopoly restrictions and policy confusion," he says. "Perhaps we don't need fiber optics today to accomplish telecommuting effectively, but if it turns out that we need it later, the US may be at a significant disadvantage to the rest of the developing world."

For more information on topics mentions in this article, contact: Larry Nichols, Charles Grantham, The Institute For The Study of Distributed Work, 725 Washington St., Suite 210, Oakland, CA 94607. (510)834-1484. Fax: (510)834-1486. ■

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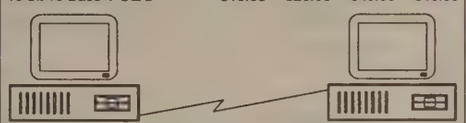

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MTIM09b

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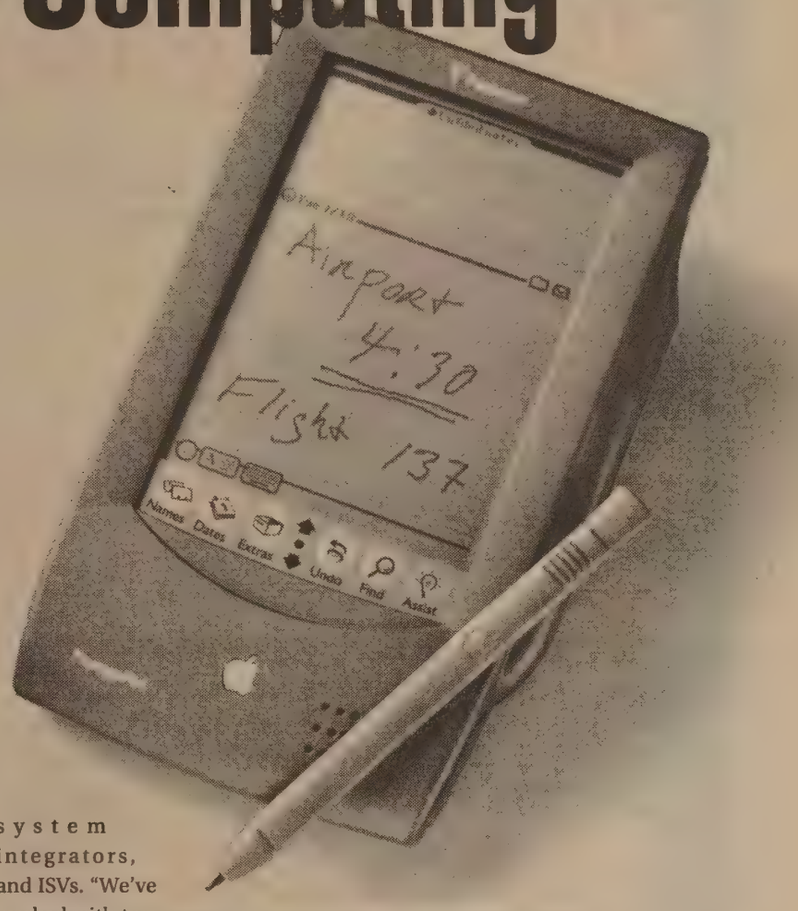
Newton

Very Personal Computing

Pocket-Sized MessagePad Adapts To Its Users



By Mary Eisenhart
Photos: Michael Jay

After roughly six years of brainstorms, false starts, paradigm shifts, and all-nighters, Apple's long-awaited and much-ballyhooed Newton MessagePad debuted August 2 at Macworld Expo in Boston. The MessagePad is expected to be the first of many devices—envisioned in one promotional brochure as encompassing everything from wristwatch-sized data entry pads to refrigerator-mounted family message centers to classroom-sized digital whiteboards—which utilize the long-awaited and technologically advanced Newton technology.

The devices won't all come from Apple. In a major departure from its historic lock-up-the-crown-jewels strategy, Apple is encouraging outside hardware developers to license the technology and build their own Newtons. As all the available MessagePads were quickly snapped up at the rollout (by the time you read this, they should be available at dealers nationwide) some eager buyers found solace in Sharp's version.

When the Macintosh was unveiled in 1984, it included bundled software (MacWrite and MacPaint) to showcase its unprecedented capabilities. In similar fashion, the MessagePad comes with built-in applications and communications tools. Its handwriting recognition, much of it the work of a Russian software house called Paragraph, recognizes both cursive and printed handwriting and "learns" the individual user's idiosyncrasies (initial reports seemed to range from delight, usually among people with neat handwriting, to frustration, usually from people with messy handwriting). Information can be gathered, stored, and formatted in free-form fashion, with "ink" handwriting, printed text, and graphics in the same page; it can be organized in calendars, names files, and to-do lists. Using built-in infrared technology, it can even be "beamed" to other Newton or Sharp Wizard users in the same location.

It supports a wide range of industry-standard printers, fax machines, and modems, and, with the upcoming release of the Newton Connection Kits, can exchange data with Macintosh and Windows computers—indeed, with the Pro version of the kits, place and synchronize the data in appropriate desktop applications. And, with a host of outside products coming along in PCMCIA and other formats, it can quickly be configured as a highly specialized tool for the particular needs of each user.

Philip Ivanier, manager of the Developer Relations Group for PIE (Apple's Personal Interactive Electronics division, which includes Newton), notes with satisfaction that the new platform is attracting great interest from software developers, from industry giants like Oracle to startups developing their first product, as well as in-house developers in large corporations, special-purpose system integrators, and ISVs. "We've worked with two hundred or so integrators and developers thus far, bringing them on campus and teaching them to write Newton applications. In a matter of six weeks or so we've seen in excess of thirty different applications being demoed at our intro, which is more new third-party applications being shown for a new platform at intro than had ever been shown before. Developers see this as a great opportunity—a new platform, new beginning, some new abilities to do some new things they've never been able to do before."

Newton's operating environment includes some novel features. All stored information is available to all Newton's applications, suspended in what its designers call a "data soup," allowing users quick and easy access to whatever's needed. Additionally, its "intelligent assistance" feature lets the machine learn its user's work habits and anticipate frequently performed operations, so that the handwritten message "fax Bob" might bring up a listing of all the Bobs in the database and present the appropriate templates and menus for faxed messages.

As the virtual dust from the rollout was settling, we visited Donna Auguste, manager of Newton Software, and software wizard Steve Capps (known to Mac veterans as the author of the original Finder) of the Advanced Products Group, in Apple's new R&D center.

This is not a small, portable Macintosh; it's a radically different thing. What were you trying to achieve—what did you think needed doing that couldn't foreseeably be done with a Mac?

Donna Auguste: It's a very different orientation. What we were trying to do was create something that was largely a communication device, and largely a helping device, or an assistant. In doing that, we wanted to give people something that's very easy to use, very fluid and very mobile, so they could always have it with them if they choose to.

But also, very adaptive, so as you use it and spend time with it, it becomes

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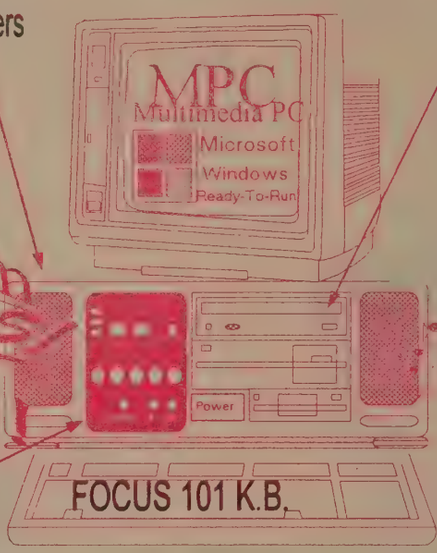

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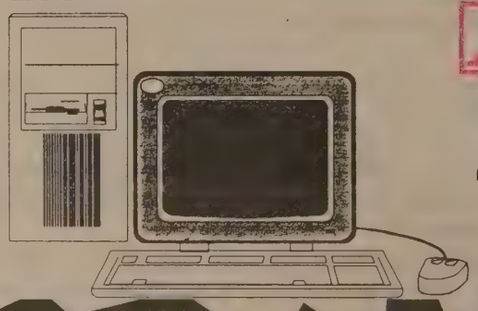

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more a reflection of the way that you do things of your own, the way that you communicate, the way you work on a day-to-day basis. This is a fundamentally unique perspective that we took from the start, in terms of the design of the system.

The technologies that had been investigated by some very talented people for a long time just came into play as we tried to put the pieces together to accomplish that.

Where do the various bits of technology come from? The processor came from your joint venture with Acorn, and a lot of the handwriting recognition came from Paragraph...

Steve Capps: Pretty much the rest of it came from inside Apple. All along, if somebody outside or somebody in another part of Apple had some interesting technology, we'd talk to them. And obviously, from Apple people, we'd steal what we could, because there's no sense not taking advantage of other people's hard work.

There are many companies which shall go nameless that we've dealt with here and there, trying to take advantage of their stuff, but it didn't work out. We weren't trying to invent everything here; Paragraph and a couple of other companies had some interesting handwriting technologies. We evaluated them, and Paragraph definitely came out the clear winner in terms of walk-up performance, so people could use it and not have to train it, not have to sit there and go through a lengthy process. It does get better with a person's use, but it has great walk-up performance, which is very important when somebody walks into a store and tries to use it.

We started this project with a clean sheet of paper. Starting from scratch was the hard part, and it took us many years to get enough critical mass on a piece of paper to ramp the other engineers up and get something we felt was a product.

At the stage where press first started seeing it, the ideas were already pretty jelled. The code obviously wasn't. By doing lots of user tests, lots of experimentation, you refine it, rewrite stuff.

But most of what I'm talking about is what we saw before that stage, when we bit off more than we could chew, going down many false leads—all the good things that you do when you experiment. We have the scars from all that.

What you first saw with the press and what we finally shipped—conceptually it's very, very similar. The product at that point had been pretty well defined—it just was a *mere* question of implementing it. Which was very difficult.

When you take the mindset of just adding handwriting to an existing platform, like making a pen Mac or a pen Windows, you end up getting lost. "I do this with a mouse—how do I do the equivalent with a pen?" Or, what's even worse, especially with Windows, "I do this with a keyboard"—because Windows is very strongly keyboard-based—"how do I do this with a pen?" You use Windows, you always have DOS lurking underneath it. You use Pen Windows, you always have keyboard-based Windows, mouse-based Windows, and DOS lurking underneath it, so you're just adding more and more layers of an artificial superstructure that you really don't need.

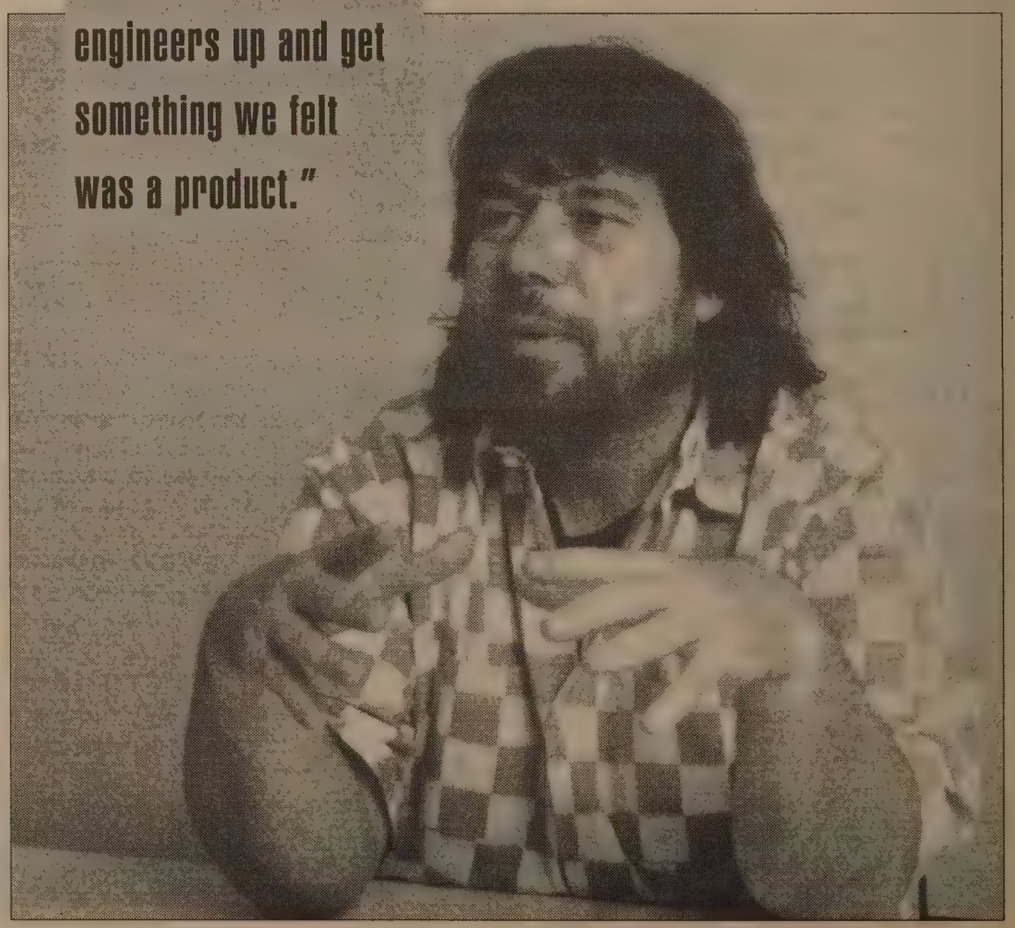
There's advantages of making a pen Windows or a pen Macintosh, but there's a lot of baggage, both literal and emotional baggage, that we get by doing that.

What's worse is your customers say, "I've got my Excel macros and I have to be able to run that; I have PageMaker and I'd die without PageMaker." They don't understand that PageMaker on a screen that's 3 x 5 inches doesn't make a lot of sense.

We kind of saw that movie with the Mac and the Apple II.

Yeah, exactly. "I can't run my favorite Choplifter game that I ran on my Apple II."

Steve Capps: "We started this project with a clean sheet of paper. Starting from scratch was the hard part, and it took us many years to get enough critical mass on a piece of paper to ramp the other engineers up and get something we felt was a product."



So anyway, by pushing reset we gained a lot of freedom there.

DA: One of the other things that's different between this system and some other systems is that in the Newton system all the information is stored—users put their data in, data they want to be able to communicate, and give to other people, and add to, and enhance with information coming in from other people. You want to take it and put it into a relatively rich structure, as opposed to just a relatively flat structure.

With a rich structure in place, you have a lot of different applications that can access the same information. You don't have to go and swap context and bring in another application with this data. You have a set of information with all the links and relationships in place, and lots of applications can see, with different viewpoints, that same set of information, and share.

By having put that structure in place with that information, and making it more like a knowledge representation as opposed to flat data, we can leverage it for things like Newton Intelligence.

Newton Intelligence is based on the notion that if the user has put some information in the system, and wants to act on it or do some action that takes advantage of it, we'll try to understand or guess as much as we can about that action or that task.

For example...

SC: Say you had a group of people you worked with, and had messages like "eat at 3." You sit down at a Newton today, and you want to write a very short message. My message is "Meet me."

So I write "Bob," and it says, "I understand what 'Bob' is"—it kicks in the intelligence, it looks up all

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the Bobs I know, it gives me a choice of the Bobs. So I can pick the Bob, and then I say, "send the message."

When I wrote my application, I didn't have to worry about how to store names, where to put this information. In fact I didn't even have to program this thing—this is all built in. To write this application, all I had to do was take an existent piece of the Newton, put it into the form that lets you write in a name, put in a little form that says "put the message," and then I just have to write ten lines of code that know how to send this message.

It can drag out of the names database the person's email address, the phone numbers, whatever parts I wanted.

I actually started to write this once on the Macintosh. On the Macintosh, there is no unified data of names. There's no database. In my Macintosh, I have a HyperCard stack that has people's names in it. I have a contact manager with people's names in it. I have names all over the place. So I had to write my own names management piece of software. Here it's all together.

What's so cool is that application developers get access to this, and don't have to worry about "How am I going to store names?" That's already taken care of for you. But let's say you have a special way of addressing email in your company—well, you can just add to this data easily. For somebody else, it may be their astrological sign.

By having this unified data that's shared, you get a much more powerful environment to write applications in, and it's much easier. This application took about an hour to write on the Newton. On Macintosh I got the window up, and that's about it.

If developers can do custom apps much easier, it makes everybody's life as a consumer and a user much better, because you don't want to sit there and think, "Well, I'll use that stock program, but it's overkill for what I really want." You can whip together these little apps that are exactly the way you want.

When you say "you," do you mean the average user, or the developer?

The HyperCard-type developer could do this without even breathing hard.

DA: For the end-user, what it means is that when they have a Newton application, on one of these PCMCIA cards, they bought it because they were going to use this particular Newton. Later, when we've taken the technology and done a lot more different things based on that same technology, everything that uses that Newton information at that level and up, like these applications would, can run on things that use Newton technology underneath.

So we take this and we create different forms, different ideas, different concepts of products, but based on the same underlying information structure and the same toolbox. A lot of those apps will be able to run across those platforms.

Okay, this is really neat, but I've got half my life on my two Macs. Clearly, as you said, PageMaker is not a fit for this hardware, but sometimes you're going to want to take the information in Newton and move it into PageMaker.

DA: The idea of Newton Connection is that you can exchange information between the Newton and the desktop. The whole idea of being a communication device means that you have to be able to go outside of this device very easily to bring information in and send information out. Supporting things like faxing and printing is part of being a communication device; but also, a large part of that is supporting ready exchange of data with the Macintosh and with the PC. Newton Connection runs on Macintosh and runs on Windows; you can upload and download stuff, you can synchronize information between this Newton and the desktop.

SC: You want the nerd angle to all this?

Please.

Okay, another good thing about all this is—here I'm writing an application, and I'm adding, like, a WELL address to the concept of a person. That will automatically get uploaded, that's preassembled.

But let's say I'm an astrologer, and I've got some kind of special database my application needs. With no work from the developer, that will automatically get uploaded to your desktop machine; but what's cool about it is you can edit it in both places.

Say it's Astrology Inc., and you can come in and get your horoscope while you wait. They could be sitting there on their desktop machine doing the forecast for this person; when I come in with my Newton, because I'm out there in the field doing the field horoscopes, I can synchronize up and I can see what you told this person the last time. With zero work from the developer, the data is automatically shared and editable on both sides, and that's very useful.

With the Connection Pro you can use Apple Events to take information out of the connection program and share it amongst desktop programs.

One of the cool things a third-party developer showed at the rollout—they really get the idea of Newton, which is that you write down "Hertz $59," and you click the Assistant button.

If I were doing your expenses on a handwritten form, you would just say, "Hertz $59," and I'd go, "Oh, Hertz. Car rental." And I'd go to the slot that says "Car rental" on the form, and fill it in. When you as a desktop computer user say, "Oh, I like my desktop machine because I can fill out the form directly"—well, you have to futz, and you have to go figure out

Donna Auguste: "Newton Intelligence is based on the notion that if the user has put some information in the system, and wants to act on it or do some action that takes advantage of it, we'll try to understand or guess as much as we can about that action or that task."

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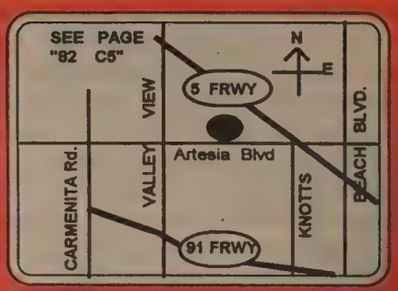

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where the car rental is, what date it is, all this stuff.

So what these guys have done is, you write "Hertz $59," click the Assistant, it comes up and says, "Oh, this is a car rental. We're assuming you mean today because you're doing it today, but you can also change that." And when you hit OK it will record that. When you dock to the desktop computer, it pulls that data out and uses Apple Events to go throw it in, however you manage your expenses. So if you use Excel, and you have named fields in Excel, it will be able to find a Car Rental field and go "Boom!" and paste it in.

It sounds kind of mundane, but when you think about all the steps that it gets rid of...

Computers have been this wonderful way of making us do a lot of data processing. They don't do it down in some basement place any more; you don't hand your receipts to somebody and they just disappear; we all do it now. What we try to do with Newton is make it so much simpler—"How many times do I have to tell you that Hertz is a car rental?" Really, once. We all assume Hertz will be around for a while; in fact the third party has figured that out, and we never have to say that it's a car rental. They understand the major hotel chains, airfare, car rental, things like that.

You just take a little bit of intelligence and apply it across the board, and suddenly things get really fun. The whole shtick about computers up to now has been "How do I make it easier for you to do your work?" And what we're trying to say is "How do you make it easier to get stuff done?"

We could throw the best user interface in the world at you to make you do all the steps. Word processors and PageMaker made it fun that you do a lot of work to get beautiful-looking things. Well, why not make the computer do a little more work, and still get beautiful-looking things?

That's kind of the direction we're going—you don't fuss with margins and fuss with fonts, you just say, "I want it to look good like this," and you point it to a format, and we go out and try to format it to match that.

DA: So the customer's doing more of the little note-taking things, little pieces of information, like you do when you're traveling and you wind up coming back from your trip with this pocketful of little pieces of paper and little receipts and notes, and you're trying to figure out what was what day and what was happening. Doing that in Newton means the system is going to take that stuff for you and try to do as much as it can to process that into the same file format. It's more like what you see a lot of people doing, when they're doing note-taking and organizing of their own.

At what point did you get users involved in testing this? What happened when outside people started getting involved?

SC: Early on, you start bringing your friends and spouses, that kind of thing, in. You're at home working and you say, "Hey, what do you think of this?" and they give you this blank look and you go, "Oops!" But they've been involved since literally the very first few months.

DA: From the time we were trying to figure out what stylus to use.

SC: It's kind of funny—you have to be 100% empirical when it comes to users. You can't theorize. You gain experience, but it's all measured. You cannot prove a hypothesis at all. Whenever you deal with users, you must be prepared to be completely humble, constantly.

Who needs this right now?

SC: Like Donna just said—say you just paid your car bill, you're not going to whip out your PowerBook and say, "Just a minute, I'm getting it into Excel..." I'm sure there are people who do this, but they're ultimate nerds.

You could see whipping one of these Newtons out and writing "Hertz $79," and then just stuffing the receipt in an envelope and never having to deal with it.

DA: I'd say people who need this are people who have a lot of information flowing in and out of their lives because they have a lot of communicating to do and things to keep track of. That's what it helps to do.

SC: The other thing she said, which is very important—since there's not 8086 assembly language instructions buried in our applications, applications you buy today will live for a long time. So things that you get used to today are only going to get better, and hopefully you'll see Newtons inside cameras. You'll see Newtons inside everything. You'll be able to use those applications everywhere it makes sense.

Of the applications that currently exist that you've seen, what do you think are the most interesting?

SC: My favorite's the expense manager thing, because I just waste so much time doing expense reports. Games are fun. What's also amazing is how fast people are writing serious applications. Much faster than with the Macintosh.

DA: It's hard to choose which app I like the most, but one I definitely like a lot is the [Fodor's] travel guide, because I get lost all the time. When we went to Boston, it actually was genuinely useful to have that travel guide. It does all the navigation and charts a path for you. "What is the address of the hotel I just checked into, now that I'm not there anymore and I can't remember how to get back there?" It's right there on the screen.

The fact that it's with you means that you don't have to go look stuff up, you don't have to keep asking people, you have it right there in your hands, and you just use it. That's one I like a lot.

Do you see a huge migration of book publishers to this kind of medium?

SC: Yeah, I think there's going to be a lot of content. One of the concepts that's going to be interesting is the concept of Reference Plus. Think of the Birthday Present Advisor, where you're sitting there and saying, "I've got to get something for my father's birthday." It might ask you a few questions—"Does he like golf?" or something like that—and help you narrow down the decision, then just start randomly selecting things. That's a lot of content, but you have to have a little bit of intelligence, take advantage of the processor. There's the equivalent of a Mac IIfx hiding in this box.

[*Taking out PCMCIA card*] This is the future.

DA: There are lots of different devices coming out in that PCMCIA form. This receives pages. It's really cool and really convenient. With this kind of a thing, your pages will show up as text on a screen. Right now we're in beta on this—you can get the kinds of pages that people send you explicitly—"Mary's in the lobby, go down and get her"—but you can also just get the stuff that shows up every day. The newswires, the news service, the things that just come through once you've subscribed and said that's something that interests you. You just get that stuff on your Newton. It just shows up.

How much of a problem is the equivalent of disk-swapping with the PCMCIA cards when you change applications? Do you have to change cards all the time?

SC: Well, the typical way to use it is you might have a peripheral and a memory card. This pager actually has a little memory in it, so the pages that come in when it's not plugged in get saved here.

But as we all know from any computer, it has too few slots and too few disk drives. It's like everything else. And of course we all want it to be infinitely thin and infinitely light and infinitely cheap. There's going to be some people that have ten of these gadgets, and they're going to curse the day we didn't make a ten-slot Newton. But we're designing it for affordability and portability right now.

Some application-mongers will keep one memory card in the slot and put all their applications on it, because all the apps have a tendency to run very small. This is a 2MB card; it would be a long time before I filled that. People who are much more on the go would probably keep a pager card there. But swapping's fine, you just pop it out and pop it in.

Do you expect a lot of third-party people to make Newtonoid devices?

DA: Definitely. We're licensing the technology.

SC: That's what's even more exciting. I was kind of glib about Newton in a camera, but there are going to be some really cool Newtons out there that we have never even thought of.

But also, just take a look at how many devices you buy today that have an LCD screen on them and a computer in them. And you say, "Why am I paying for all this proliferation of computers?"

Probably the most obvious right now is GPS devices, these things that tell you where you are in the world. I just saw a Sony device that looks almost identical to this, has a million buttons on it, has the same size screen. If you talk to an engineer, the guts of the GPS part are actually very cheap relative to what you pay for this whole device—the device is two or three times more expensive than the Newton—because the quantity's not there.

So give me the GPS guts, put it in here on a card, and now I have a beautiful user interface, the ability for expandability by putting apps in on here. I have everything I want, but I can use it in many places. I can now use that also for keeping my addresses. You could imagine a world where every device has an address book in it, a notepad in it; or you could just, say, put peripherals onto the one smart device that you want to carry around with you—cellular phone, GPS, all that stuff. You might want a scanner...

People are going to do cool things. ■

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TwinBridge Chinese System

Multilingual System For Windows

BY: HUGH R. CLARK, PH.D.

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In our constantly shrinking world, people from different cultures, speaking and reading different languages, must interact regularly. Therefore communication across the boundaries of culture and language has grown ever more important. As the people on both sides of the Pacific and the languages they speak come in more frequent contact, the ability to make that communication will be ever more critical.

TwinBridge 3.1A, the newest edition of the multilingual programs from PCExpress of Rosemead, California, can't teach you the languages themselves, but it is the easiest and most versatile solution to date for those who have wished they could insert foreign language characters into English-language documents. The program combines with Windows to make inserting Chinese, Japanese, Greek, or Russian into English texts as easy on PCs as it has long been on the Mac.

This is the ideal program for people who need to compare translations or transliterations of foreign terms in English documents with the foreign original. It is equally essential for those who compose documents or correspond in Chinese or Japanese, using their regular English word processing program rather than the often awkward foreign programs.

TwinBridge 3.1A combines all the flexibility of powerful programs such as Microsoft Word for Windows with ready access to over seven thousand Chinese characters in as many as eight separate character fonts. In addition, the program supports Japanese kana, including both hiragana and katakana, plus the Cyrillic and Greek alphabets. It is further supported by a built-in Chinese phrase dictionary with over fifty thousand phrases of two to four characters, as well as an English-Chinese dictionary composed of over five thousand words and phrases.

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USING TWINBRIDGE

TwinBridge 3.1A is a WYSIWYG program, and is designed to work in conjunction with all the Windows internal applications, including Write and Paintbrush. It also supports a wide range of software designed to work in the Windows environment, including Word, Excel, Freelance Graphics, Harvard Graphics, Lotus 1-2-3, PageMaker, Peachtree Accounting, Quicken, and a host of others.

TwinBridge does not support DOS programs accessed through Windows, including the DOS versions of the above programs. While somewhat workable in these contexts, it is also not fully reliable with other programs adapted to the Windows environment, such as WordStar or WordPerfect for Windows, neither of which reliably embeds the characters into text.

Like most programs designed to enable the joint use of Chinese with other languages, TwinBridge functions as an interface between the operating system and the application program. When you're using Windows applications, or any compatible application program such as Microsoft Word for Windows, the application program functions normally. When you want to add foreign characters to your English text, you activate TwinBridge within the application program by a simple keystroke. After making the insertion, you then toggle back to English and proceed normally.

As an additional benefit, you can compose documents entirely in any of TwinBridge's multilingual formats without leaving your application program. This means you can write letters, compile databases, etc., in any of the foreign character formats and still take advantage of the strengths and flexibility of the programs you are already familiar with.

Using power and flexibility it derives from the Windows environment, TwinBridge offers considerable advantages over its predecessors. Among the most significant is the ability to readily switch between the font options of your application program and as many as eight Chinese character fonts. The fonts include options in both traditional and simplified characters, which are important for anyone corresponding with people on the mainland. As an alternative to switching between the TwinBridge character fonts and the fonts of your application program, you can work entirely within the TwinBridge fonts, which support a standard Roman typeface for entering English. (Note: do not be deceived by the appearance of this typeface on your screen, where it will look somwhat different from standard Roman fonts. When printed, this font is indistinguishable from the Windows Roman font; this is one of the rare instances in which TwinBridge is not WYSIWIG.)

Entering characters into a document is simple and direct. TwinBridge recognizes seven options for entering Chinese. Most users will probably use the Pinyin method, a widely known system for transliterating standard spoken Chinese. Because Pinyin is based on our own alphabet, it can use the standard American keyboard layout and so does not require learning any special keyboard settings.

On toggling into the TwinBridge input mode, the program displays several dialog boxes on a single line at the bottom of your screen. The Pinyin transliteration you enter appears in the "input" buffer. Once the program recognizes a transliteration, the "selection" buffer displays all the possible characters, from which you make your choice.

As one alternative to Pinyin, TwinBridge also recognizes the Zhuyin transliteration system. Zhuyin, used widely in Taiwan, is based on a set of specialized phonetic symbols. TwinBridge uses the standard

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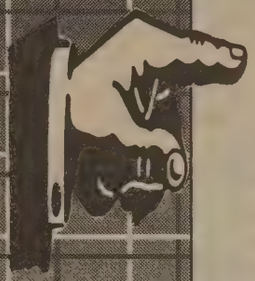

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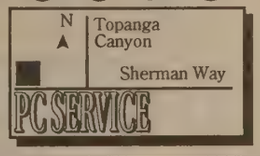

Zhuyin keyboard for this input method. A second alternative is to use the built-in English-Chinese dictionary. The dictionary recognizes over five thousand English words and phrases, any of which can be entered into the "in-put" buffer. The "selection" buffer then offers the available choices. Other entry methods are more technical, including systems based on standard Chinese numerical codes for characters and others based on the structure of the characters themselves.

You can access TwinBridge's built-in dictionary of over fifty thousand Chinese phrases of two to four characters through any of these options. In the two phonetic options, Pinyin and Zhuyin, you simply enter the first letter of the second word, and the program will automatically list the dictionary options in the "selection" buffer.

Initially, Twinbridge arranges characters and phrases in the "selection" buffer according to general patterns of usage. In transliterations with dozens of possibilities, you may have to toggle through multiple lists in the "selection" buffer to find the character or phrase you want. As you make your selections, however, TwinBridge rearranges the entries according to your own usage patterns. Thus TwinBridge increasingly reflects your own needs, and you can use it with increasing speed. Your most recent selection always is the first character or phrase listed.

Japanese, Cyrillic and Greek, like Zhuyin, are each dependent on their own keyboard settings. Kana are entered according to the standard Japanese keyboard layout. Cyrillic and Greek are both arranged according to the standard IBM-PC layout. All three are entered directly into your document without using the "selection" buffer.

One of the most valuable options of TwinBridge is the "automatic blank space function." Because TwinBridge enters all characters, including Japanese kana and the Cyrillic and Greek alphabets, across two spaces, it is possible to split a character in half at the end of a line. This optional function adds a blank space between characters. By invoking it, you can avoid having half an entry wrapping around at the end of a line of text. If there is a single space remaining on a line, the blank space automatically fills it and forces the next character to wrap completely around to the next line. Although this function is optional and can be turned off, using it helps avoid massive editing headaches that can result when half of a character is stranded on the preceding line.

OPTIONS

TwinBridge 3.1A is available in a range of configurations. At the low end of the spectrum is the two-font Basic package. This allows for input in both simplified and traditional Song-font, as well as Japanese, Russian, and Greek. The Basic package, which is also available in five- (traditional Song-, Fang-, Kai-, and Bold-fonts and simplified Song-font) and eight-font (traditional and simplified variants of Song-, Fang-, Kai- and Bold-fonts) versions, prints in 24 x 24 bitmap fonts; it ranges in price from $149–$399.

The more expensive Professional package, which comes in the same range of font options, prints in 256 x 256 outline fonts, resulting in a significantly cleaner output on both dot matrix and laser printers. The Professional package ranges in price from $399 for the two-font option to $749 for the full eight-font combination of traditional and simplified characters; this review is based on the five-font Professional package, which retails for $599. All configurations are dependent on a copy-protected key disk, which must be loaded as you load Windows, or TwinBridge will not operate. Once Windows is fully loaded, the disk can be removed.

The program can also be enhanced by two supplemental programs: Dictionary Manager, which allows you to add your own phrases to the fifty thousand-plus included in the built-in phrase dictionary; and Font Editor, with which you can build additional characters beyond the original seven thousand-plus by a cut-and-paste process. Neither comes with any of the standard packages, and neither has been reviewed. Both cost $59.

TwinBridge 3.1A characters are clear and easy to read:

Traditional Song font (14 point):

Traditional Fang-Song font (14point):

Traditional Kai font (14 point):

Traditional Bold font (14 point):

Simplified Song font (14 point):

The range of possible size depends on the printer one uses. The program will support characters as small as 4 point and as large as 85 point.

All TwinBridge 3.1A packages require at least a 286 system. Because TwinBridge actually works as part of the application program, it reacts virtually instantaneously to your keyboard entries; more advanced CPUs do not make its response perceptibly more rapid. To run the TwinBridge Basic package requires at least 1MB RAM; the Professional package requires 2MB RAM. Your disk requirements will depend on how many fonts are in the version you choose: the Basic packages requires 3, 5, or 7MB for the three-, five- and seven-font versions respectively. Similarly, the Professional package requires 6, 12, or 18 MB, again depending on the number of fonts. All packages require Windows 3.0 or 3.1 (the manufacturer recommends 3.1 because of some minor compatability problems with 3.0). The program supports VGA, SVGA, XGA and paper white VGA monitors. TwinBridge works well with all graphics printers.

You can compose documents entirely in any of TwinBridge's multi-lingual formats without leaving your application program.

RECOMMENDATIONS

In comparison to alternative multilingual programs such as Guoqiao or Tianma, I have found that TwinBridge is a dream. It is quick to learn, easy to use, and the results are a joy to read. It is the solution that I, as a professional scholar and author, have long been looking for, to allow me to insert Chinese into documents. For those who need such a program, I give it my highest recommendation. ■

Hugh Clark is an associate professor of Chinese history at Ursinus College in Collegeville, PA.

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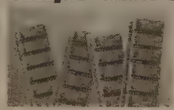

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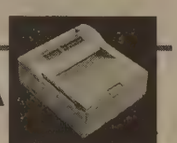

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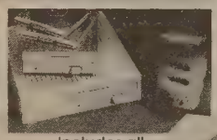

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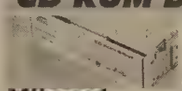

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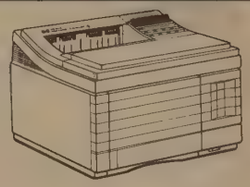

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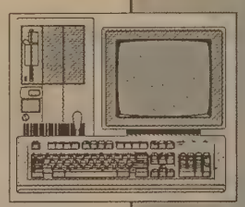

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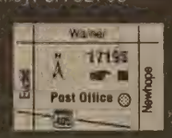

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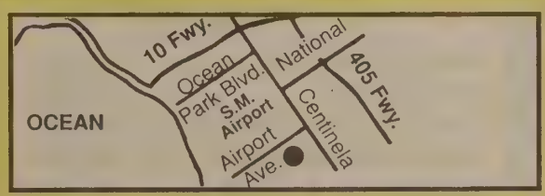

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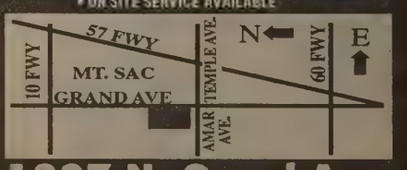

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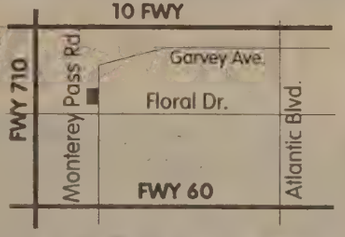

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ALI	486DX-33w/256K	1/2Size	110
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ALI	486DX-50w/256K	1/2Size	110
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OPTI	386DX-33w/128Kw/oCPU		90
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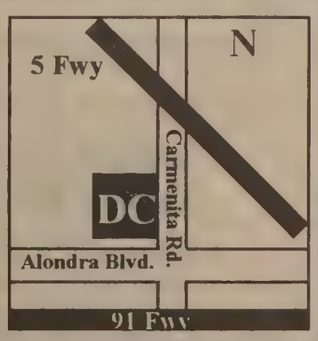

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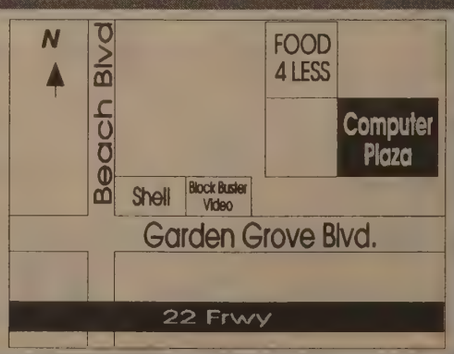

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- 2S/1P/1G•Hi-Res. Mouse
- 101 Keyboard(Japan)
- Non-Interlaced .28 Super VGA Color Monitor
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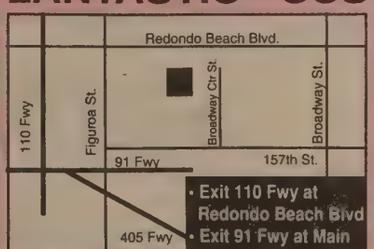

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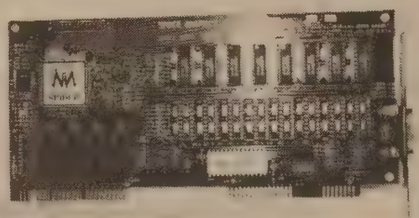
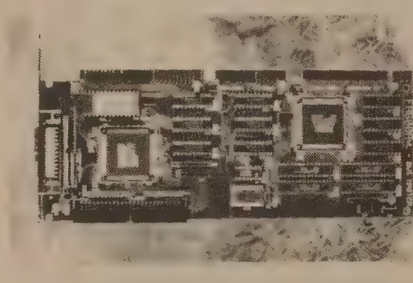
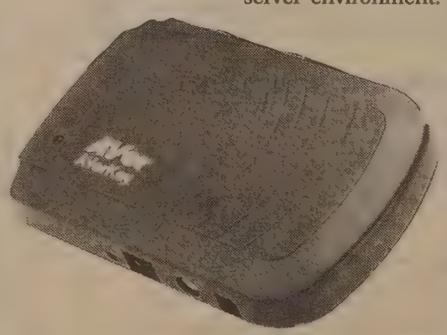
The SPiDER 32VLB and 32VLB Plus are affordable video cards using the Cirrus Logic CL-GD5426 VGA chip to offer up to 16.7 million colors at 640 x 480 resolution or up to a maximum resolution of 1280 x 1024 with 256 colors (2MB Video DRAM required). Both video cards come with software drivers that are easily installed with SPiDER's custom installation program. The only difference between the 32VLB and 32VLB Plus is speed. The 32VLB Plus contains faster components and sophisticated BIOS to boost its speed by 30%. (List prices for the 32VLB with 1MB of RAM is $169; the 32VLB Plus with 1MB of RAM is $199) SPiDER Graphics, Inc., 801 Ames Ave., Milpitas, CA 95035. (408)956-1231.



FOREX VESA SCSI HOST ADAPTER

The new FR600A VL BusMaster is a 50MHz, 32-bit VESA SCSI Host Adapter. Unique features integrated into the bus master adapter include the combination of high-speed SRAM and board level protocol providing nearly 30% increase in the Data Transfer Rate (DTR) at the same speed. In addition, a 32-bit interface delivers the high performance required for most multimedia applications. With a SCSI-2 DTR of 10MB/second and a VL Bus DTR of 100MB/second, the adapter is an ideal controller for the network server environment. Forex provides a comprehensive one-year warranty including technical support and a 24-hour response program for replacement units. ($240) Forex Computer Corp., 2121 Ringwood Ave., San Jose, CA 95131. (408)955-9280.





AVERKEY

AVerKey is a dynamic tool for the creation of business presentations, training tapes, software demo tapes, animations, and other video presentations. It gives you high-quality, flicker-free video output from any PC

UPDATES

❖ **Akimbo Systems** has acquired rights to **FullWrite Professional** from **Borland International, Inc.** Akimbo Systems assumes upgrade, support, and maintenance responsibilities for FullWrite. Akimbo Systems, Inc., 11 Rose St., Somerville, MA 02143. (617)776-5500. Email: FullWrite@aol.com.

❖ **Aladdin Systems** announced **StuffIt Expander 3.0.2**, which is 15% faster at decompression than earlier versions. The program is available free on major online services including CompuServe, America Online, and AppleLink. Aladdin Systems, Inc., 165 Westridge Dr., Watsonville, CA 95076. (408)761-6200. AOL/AppleLink: ALADDIN. CompuServe: 75300,1666.

❖ **Brøderbund** introduced **The Playroom 2.0** (for DOS), its innovative, early childhood educational program built around the theme of a child's playroom. Brøderbund Software, Inc., 500 Redwood Blvd., PO Box 6121, Novato, CA 94948. (415)382-4400.

❖ **Excellink** introduced its upgraded **JetCard** series of printer sharing solutions, which allows up to ten users to share HP InkJet and DeskJet printers or plotters. Excellink, Inc., 1430 Tully Rd., Suite 415, San Jose, CA 95122. (408)295-9000.

❖ **Inline Software** (formerly Inline Design) announced the release of **Redux Deluxe**, a major upgrade to its Macintosh backup program. Inline Software, Inc., 308 Main St., Lakeville, CT 06039. 1-800-453-7671.

❖ **Intel Corp.** is packaging free **Quicken 2 for Windows** software with all **Intel SatisFAXtion modems** through September 15, 1993. Intel Corp., 1-800-538-3373.

❖ **Polaroid** announced a special upgrade program for its **Digital Palette CI-3000** or **CI-5000** color film recorders. Customers can have their units functionally upgraded to match the new speed-enhanced **Digital Palette "S"** series film recorders. Polaroid Corp., 575 Technology Sq., Cambridge, MA 02139. 1-800-225-1618.

❖ **Quicksoft** released **PC-Write 4.1**, which includes graphics, envelope printing, customizable status line, stress indicator, Windows clipboard support, and many more new features. Quicksoft, Inc., 300 Queen Anne Ave. N., #224, Seattle, WA 98109. 1-800-888-8088.

❖ **Vertisoft Systems** announced the availability of **SPACEMANager v1.5**, a data compression utility that gives MS-DOS 6.0 and Windows users up to a 40% increase in disk space over files compressed with MS-DOS 6 DoubleSpace. SPACEMANager is offered at an introductory price of $49.95 through November 1, 1993. Vertisoft Systems, Inc., Transamerica Pyramid, 4th Fl., 600 Montgomery St., San Francisco, CA 94111. (415)956-5999.

❖ **WordPerfect Corp.** announced its enhanced cross-platform licensing program, **Easy Move**. With Easy Move, a customer who purchases WordPerfect for one platform can be licensed free of charge to run WordPerfect on any of the other three platforms at or below the current version they are running. WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057. (801)255-5000.

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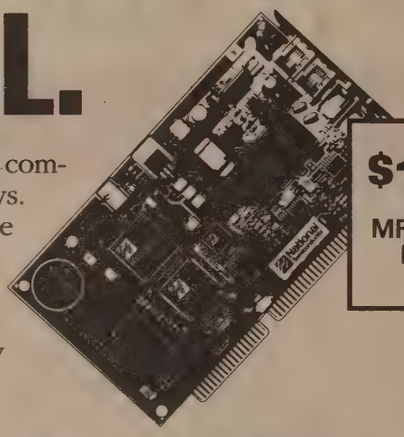

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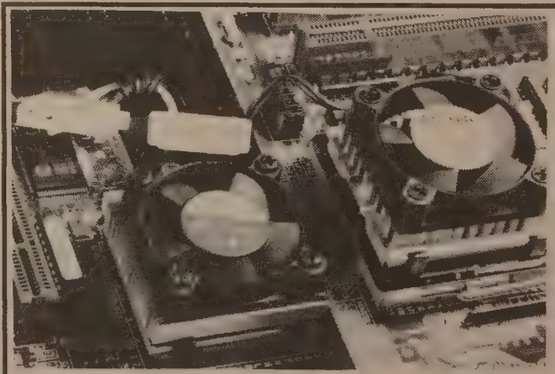

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MIDIWIN GM-32 & GM-32V

MiDiWiN GM-32 is a 16-bit dual channel audio board that lets you generate CD-quality sounds from your PC. It provides a MIDI in/out interface, microphone input, stereo auxiliary input/output, and stereo headphone output for connection to your audio equipment. The GM-32V provides all of these features plus real-time Windows Sound System compatibility. MiDiWiN audio boards also include software for your recording and playback: MKS 20-20 Sound Editor, UniSoft Sound Manager, Windows 3.1 driver, ASC Nkey 1.5 music performance software, and a mixer control utility for MS-DOS and Windows 3.1. Positive Solution Computer, 10032 San Pablo, El Cerrito, CA 94530. (510)527-6908.

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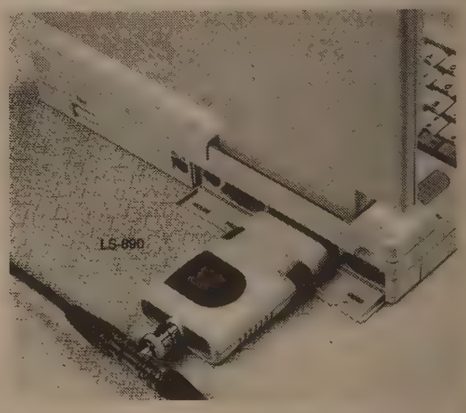

cable and unshielded twisted-pair wire, users can easily install a new node in either distributed bus or star topologies. To add a new node on a network simply plug the LS-890 into a parallel port and load the included drivers. It detects network connection automatically and supports switchless automatic installation configuration. The LS-890 also provides diagnostic software. IPX and ODI drivers for NetWare, PC/NSF for Sun, and a packet driver for TCP/IP. Wedge

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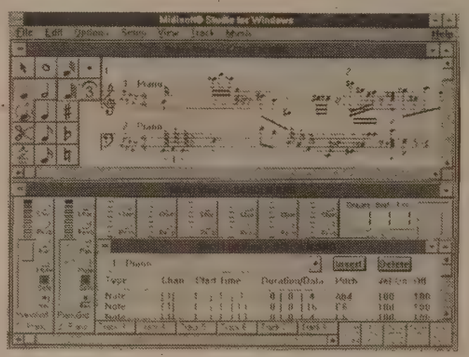

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Continued on page 74

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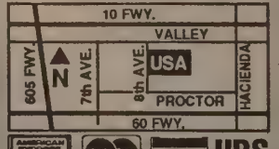

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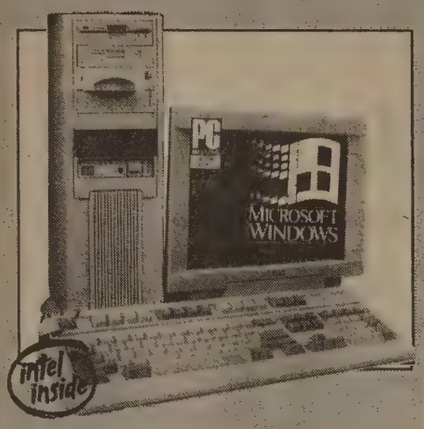

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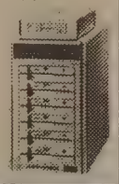

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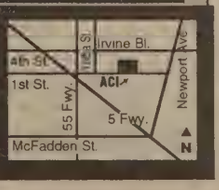

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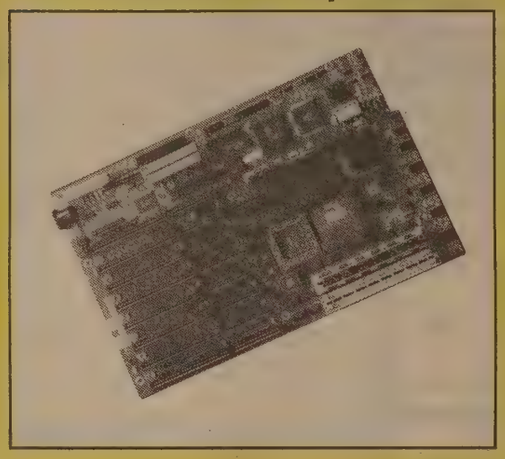

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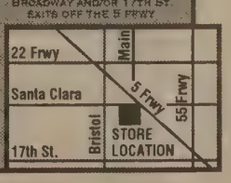

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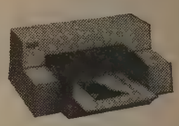

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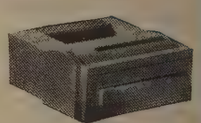

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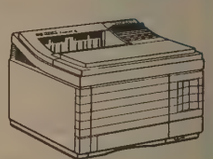

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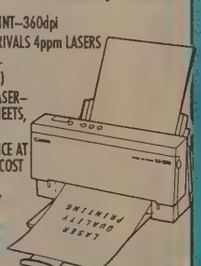

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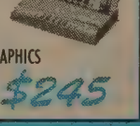

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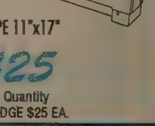

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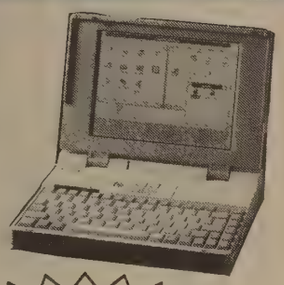

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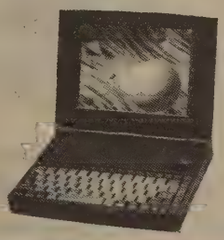

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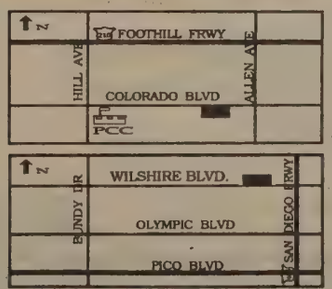

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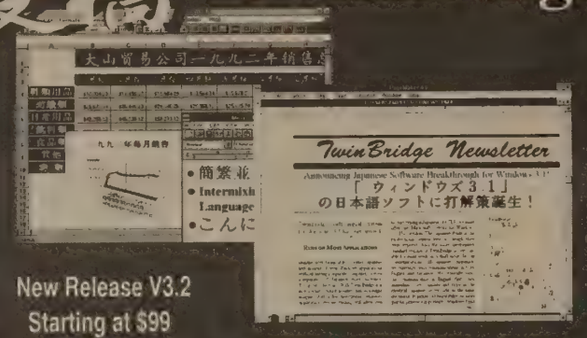

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Continued from page 68

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REVIEWS

GAME REVIEWS

By Mike Markowitz

IRON HELIX

Designed By: Drew Huffman
Lead Programmer: J.A. Nelson
Published By: Spectrum HoloByte
For: Macintosh (requires CD-ROM drive, 8-bit color graphics, at least 4MB RAM, System 7 or System 6.07 with 32-bit QuickDraw)
List Price: $99.95

Graphics and Animation: 9
Sound: 9
User Interface: 9
Overall Value: 9

A movie has the same ending every time you see it. It also requires you to drive to the theater, find a place to park, stand in line with a bunch of annoying strangers, and endure the smell of bad popcorn. A game can be different every time you play it. You can enjoy it in the comfort and privacy of your own cave. But game players have grown up on a steady diet of Hollywood production values and video special effects.

Not too long ago, computer game designers were content to emulate the experience of playing a board game, or to reproduce the dynamics of a pinball machine (or its electronic successor, the arcade game machine). Today, computer

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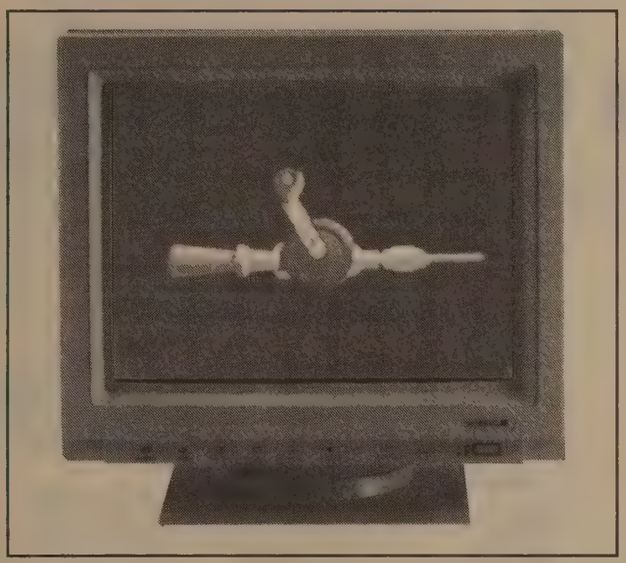

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- Resolution: Maximum 1600x1280 (Non-Interlaced) .26mm CRT
- Compatible With Apple Mac II
- Refresh Rate: 70Hz at 1280x1024
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SRC-1451 14" HYPER VGA I

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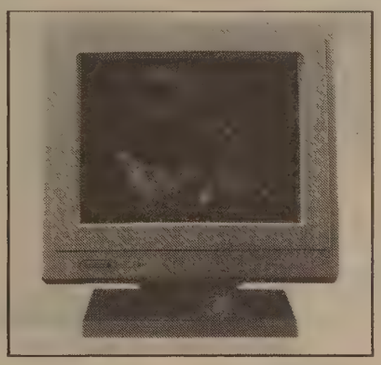

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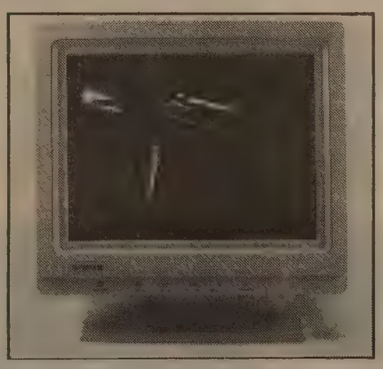

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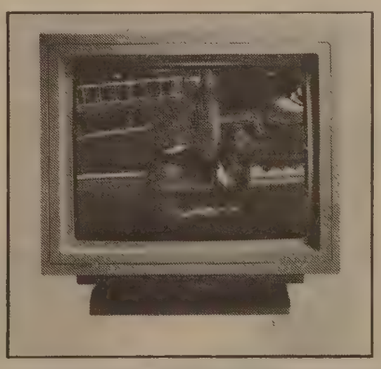

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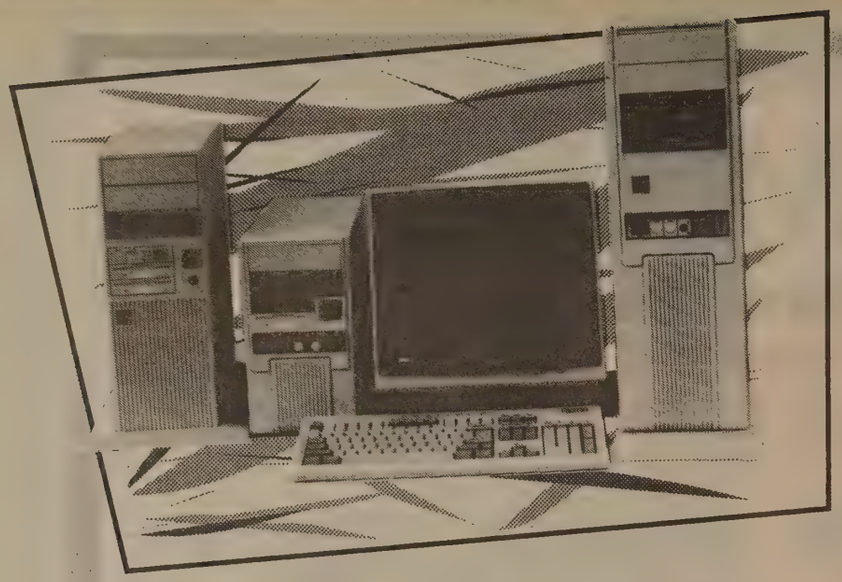

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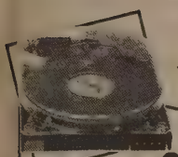

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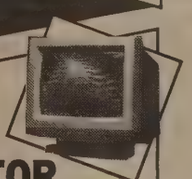

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game designers must increasingly attempt to transcend the limits of movie-making. Game development teams don't have Hollywood budgets, but on the other hand, they don't have to deal with the egos of movie stars, or open simultaneously in two thousand neighborhood theaters to have a hit.

Iron Helix is an interactive science fiction adventure game that uses the audiovisual power of the CD-ROM drive to deliver a surprisingly cinematic-like experience. The plot might be described as *Alien* without the gore. A terrible virus has killed off the crew of a starship, which is now running on autopilot, programmed to destroy an innocent planet. Remotely controlling an unarmed robotic probe, you must board the ship, evade a relentless defender robot, locate the DNA codes that will unlock doors, and enable the controls so you can save the galaxy.

The user interface is very simple and intuitive, but the game has multiple levels of difficulty and many challenging puzzles. The programmers have gone to great lengths to ensure smooth animation, even on minimally configured systems. There are none of the irritating delays or audio break-ups that spoil so many other CD-ROM-based games. The program confines the QuickTime animations to relatively small windows on the screen, but the overall design and implementation are so good that this doesn't detract from the game experience.

The 32-page user guide is formatted as excerpts from the technical manuals for the starship and the robotic probe. It includes enough hints and tips to get you started with minimal frustration.

We reviewed the game on a Mac LC III with only 4MB of RAM and an older Apple CD-ROM drive. The NEC CDR-25 CD-ROM drive will not work with Iron Helix. The way this particular CD-ROM drive buffers and caches is incompatible with the software used to create Iron Helix. NEC is aware of this problem which unfortunately cannot be corrected.

There are 508MB of sound, graphics, animation, and program code on the CD. The program also needs about 6.4MB of space on your hard drive to install the required files.

Iron Helix should remove any remaining doubts that Macintosh can be a serious entertainment platform. (Spectrum HoloByte, Inc., 2490 Mariner Square Loop, Alameda, CA 94501. 510/522-1164. To order: 1-800-695-GAME)

THE TINIES

Designed By: Didier Capdeville and Pascal Gallon
Published By: Inline Software
For: Macintosh (2MB monochrome, 3MB color)
List Price: $59.95

The crankiest, messiest, and most narrow-minded life form in the universe, the Tinies are cute little furballs of blue, red, yellow, and green. Their multilevel starship is hurtling toward Earth, and your mission is to neutralize this threat by dragging every Tiny onto a color-coordinated Sleeper.

This may not sound like much of an adventure, but it is enough of a plot device for a most delightful and amusing Macintosh game. Originally developed by Kalisto in France, the game has been localized for English-speakers

Continued on page 85

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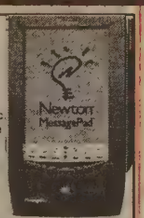

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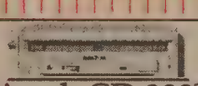

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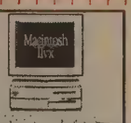

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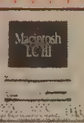

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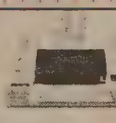

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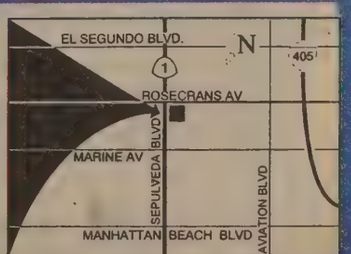

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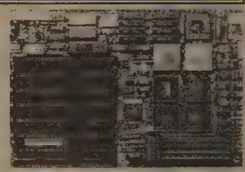

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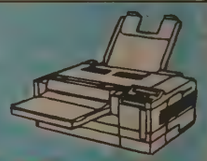

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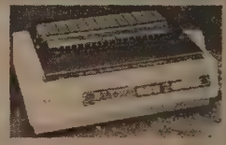

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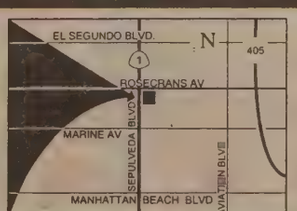

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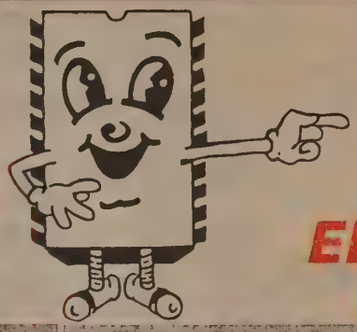

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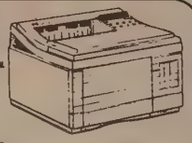

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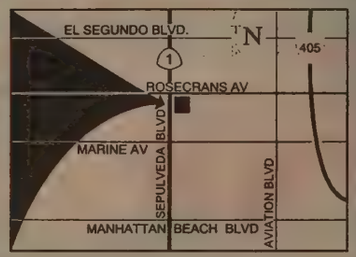

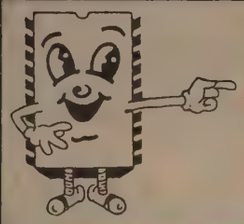

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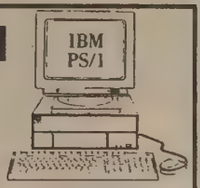

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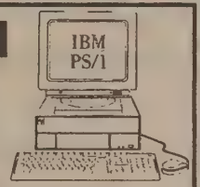

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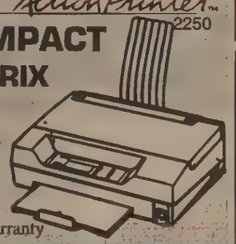

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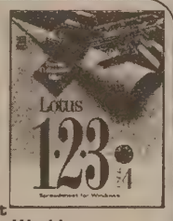

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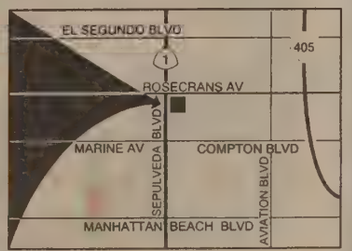

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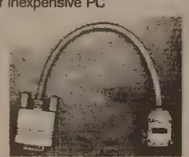

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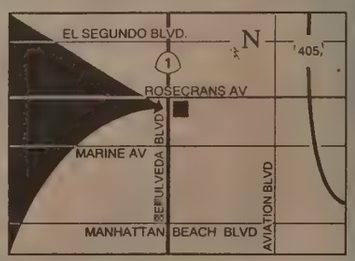

Continued from page 78

Graphics and Animation: 9
Sound: 7
User Interface: 7
Overall Value: 7

by Inline. You use the mouse to maneuver the Tiny Controller, a black square you drop on a targeted Tiny like a glass cage. They hate this, and will snarl and squirm energetically. Once you put your captive in motion, it will continue Newtonianly in the same direction until it hits a wall, or another Tiny. To keep things interesting, you will run into teleporters, directional energy arrows, time warps, and Resurrection Eggs.

Beyond the first few levels, you need to plan out a careful strategy to drag all the Tinies back to their Sleepers before time runs out.

As you conquer each level, you are rewarded with a password that lets you start a new game without having to work your way up from scratch. There are one hundred levels.

The package includes color and monochrome versions on separate disks. The color version is installed from a CompactPro self-extracting archive. At only 785K, the monochrome version is perfect for PowerBook users—it can even be played directly from the floppy disk. Documentation includes a 12-page story booklet, a compact installation and quick reference guide, and a leaflet explaining the rather quirky alphabet Tinies use for passwords. (Inline Software, Inc., 308 Main St., Lakeville, CT 06039. 203/435-4995. 1-800-453-7671)

MACINTOSH SOFTWARE REVIEW

POWER TO GO: UTILITIES FOR THE MACINTOSH POWERBOOK

Designed By: ALSoft
Published By: Claris Clear Choice
For: Macintosh PowerBook, requires System 7.1 or later
List Price: $99
Reviewed By: Mike Markowitz

With a good half-dozen look-alike competing products, the market for Mac PowerBook utility programs appears to be saturated, but when Claris, Apple's own software powerhouse, offers such a package under its own imprint, it's worth a closer look.

Most users need specific utilities for portable computers for several reasons:

- the limitations of battery power
- the limitations of the flat-panel display screen
- subtle differences in the "feel" of a trackball and a mouse
- security and network problems

Power To Go is installed from compressed files on a single high-density disk. A complete installation took only about three minutes on a PowerBook 100. Afterwards the program's various components take up about 830K of hard disk space. The program installs three INITs: the Power To Go software itself, Magic Menu, and StuffIt SpaceSaver.

Power To Go includes ten modules:

- Power Management
- Power Gauge
- Security

Continued on page 90

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486DX-33MHz	$1177	$1206	$1198	$1245	$1289	$1368	$1541
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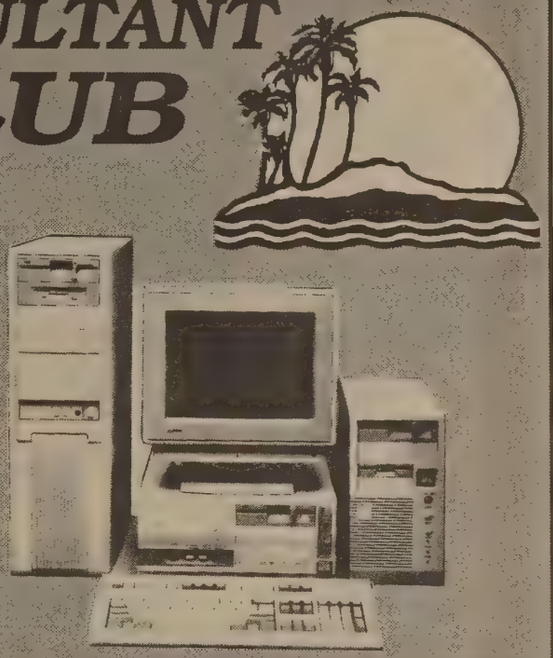

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PRODUCT SPOTLIGHT

Continued from page 85

- Cursor modification
- Menu customization
- Screen Saver
- Airport startup
- Sleep control
- Disk activity indicator
- Modem activity indicator

Rather than grabbing a section of the menu bar's scarce real estate, like many other PowerBook utilities, Power To Go confines its main displays to a configurable floating palette that includes the battery status, the estimated time remaining, the current time, and an instant Sleep button.

Magic Menu is a neat little INIT that makes pull-down menus pull themselves down as soon as the cursor touches the desired item on the menu bar—you don't have to hold down the mouse button to see the menu. This makes the trackball a little easier and more efficient to use.

SpaceSaver is a file compression utility that operates "on-the-fly"—it compresses files when you save them and uncompresses them when you open them. The process takes some extra time, but many PowerBook users are hurting for more hard disk space, and will not mind the slight delay.

Competition is likely to drive the makers of PowerBook utilities toward increasingly identical and elaborate feature sets. The Power To Go package lacks some useful functions (like a quick way to toggle AppleTalk on or off) found in other products. On the other hand, it is reasonably sized and priced, and likely to be well supported. (Claris Corp., 5201 Patrick Henry Dr., Santa Clara, California 95052-8168. 408/727-8227)

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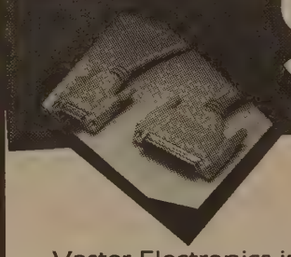
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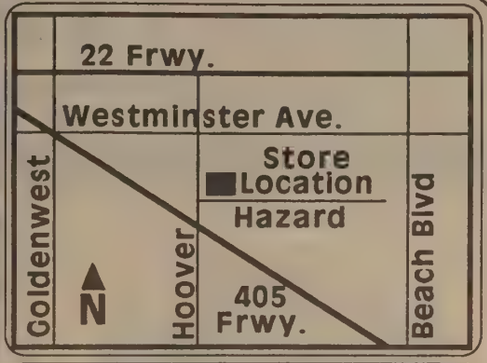

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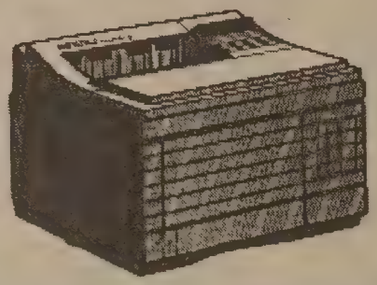

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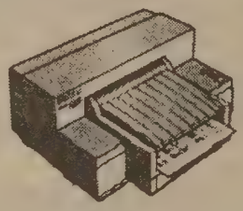

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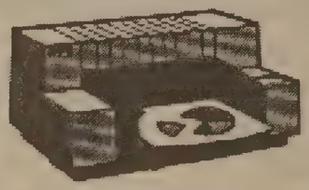

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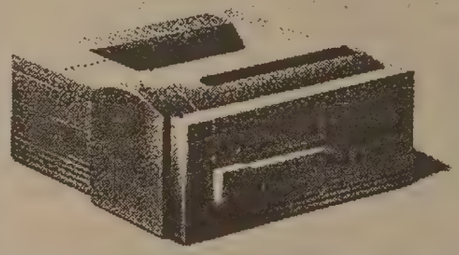

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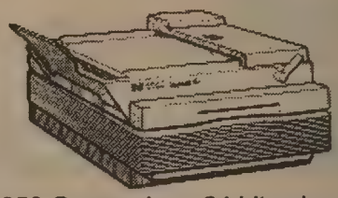

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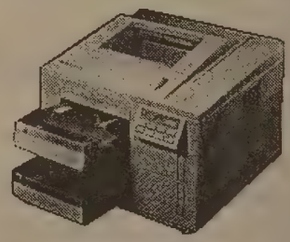

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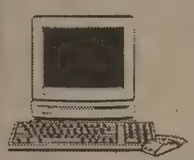

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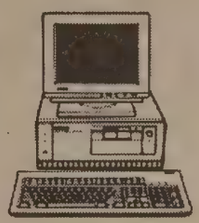

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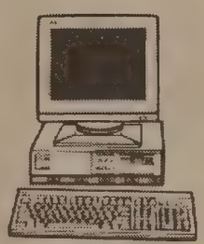

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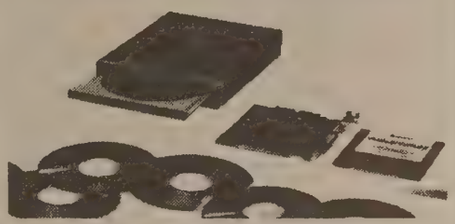

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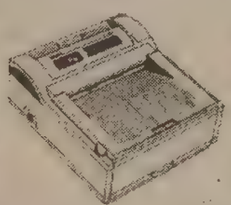

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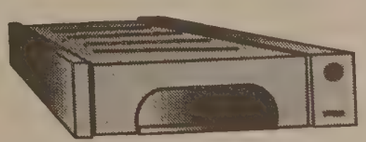

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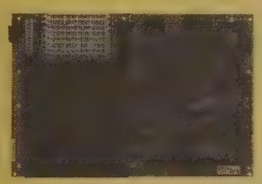

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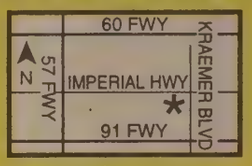

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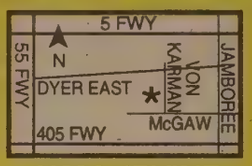

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Continued from page 12

ing the hardware and software companies, AT&T hopes that both will excel and will be able to work together to create products that will be wanted by end-users as well as other manufacturers.

IBM WOOS POWER USERS WITH AMBRA

Most "advanced" PCs being manufactured are only advanced in that they have a top-of-the-line CPU (either a fast 486 or a Pentium) and a local-bus slot, possibly with built-in video acceleration. After a few months of product differentiation, most high-end systems are now almost indistinguishable based on features.

IBM's new Ambra Computer Corporation hopes to change that by offering mid-range systems with high-end features built in. For example, the top-performing Ambras that do not have a Pentium processor have IBM's Blue Lightning 486 CPU running at 66 MHz. The Blue Lightning CPU is derived from Intel's 486 line, but with enhancements that are only available on IBM systems (although other manufacturers will probably begin to sell them early next year). Because IBM manufactures the chips itself, it can offer systems that run at 66 MHz and cost about the same as other name brand systems running at 33 MHz. All systems come with MS-DOS 6.0 and Windows 3.1; interestingly, there is no mention of IBM's new PC-DOS 6.1 or OS/2 2.1.

Additional Ambra features include built-in SCSI and 10BaseT Ethernet connections. SCSI drives are often faster than the standard IDE drives and are much more easily expanded. However, because IDE drives have always been the standard, few manufacturers offer SCSI drives with their systems. Ambra was able to leverage the buying and manufacturing power of other IBM divisions to include a SCSI interface in the box. The 10BaseT Ethernet connector saves the $100–150 that Ethernet cards cost and, more importantly, greatly reduces the hassles involved with installing the cards and setting the jumpers. The Ambras even come with a one year onsite service contract backed by IBM and 24-hour tech support hotlines.

The Ambra systems cost about the same as systems from Compaq and Dell that have fewer features. For about $2,000, you can get a 66 MHz system that runs much faster than a similarly priced name brand system; for about $4,300, you get a full Pentium system. They even offer a color portable system for under $2,500. If IBM is successful at drawing back its old customers with the Ambra line, its competitors might have to start including more advanced features lower down in their product lines.

NEW HARDWARE MEANS NEW OPERATING SYSTEM RELEASES: APPLE'S SYSTEM ENABLERS UPDATED

One of the clearest differences between the Macintosh market and the PC market is that Apple can come out with different hardware configurations whenever it feels like it. The new hardware may be a simple reconfiguration of an existing model (such as a faster CPU or a different box), but it may include radically different hardware, such as Apple's new AV series that has a digital signal processor (DSP) built into the system. Instead of having to rewrite the operating system for such major changes, Apple can simply provide a system enabler to the current operating system (v7.1).

In the PC world, life is not so easy. MS-DOS is a lowest-common-denominator type of operating system. Version 6.0 will provide the same features to literally thousands of types of systems. On the other hand, if a manufacturer wants to significantly change the base hardware set, they have to either use a more sophisticated operating system like UNIX or the recently released Windows NT, or they must add device drivers to the MS-DOS startup file. While most device drivers work just fine, they are incredibly confusing to most users and, if the startup files get accidentally deleted or modified, the system may not work. Apple's workaround, which consists of adding a single file per model to the main system directory, is much easier for even the most inexperienced of users.

Apple recently announced a complete set of the system enablers for all models released in the last year. The complete set, which fits on a single floppy, allows a system administrator to create a single system folder that will work on all Macintoshes that run system v7.1. This kind of standardization has long been achievable for PCs, but only at the cost of having overly homogenized systems. Users who needed specialized devices with their own device drivers could not have their systems universally upgraded. Apple's method of updating just the enablers will certainly win the hearts of corporate buyers who have to support both low-end Macs and higher-end workstations. ■

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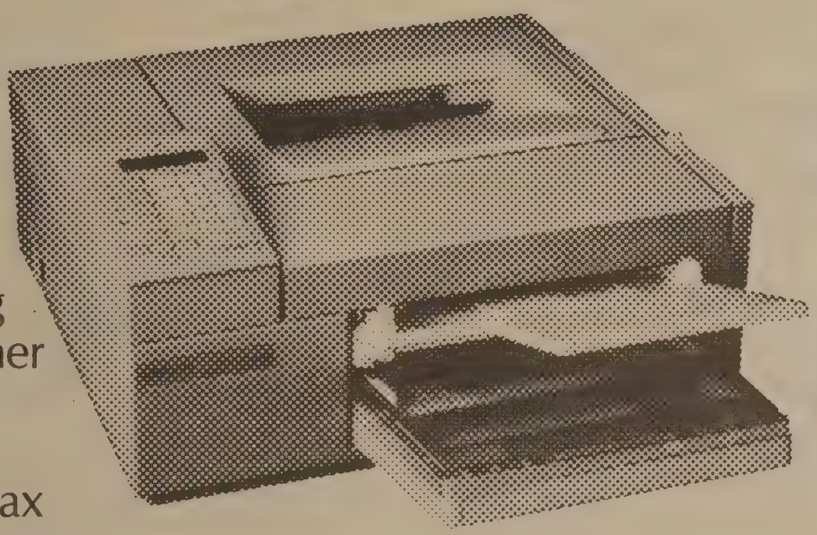

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DOW INDUSTRIALS CONTINUE RECORD PACE

The Dow Jones Industrial Average surged forward yet again last month, to reach an all-time closing high of 3615.48 on August 20—the sixth record reached in that month alone. The S&P 500 Index also stepped into record territory last month when it reached 456.43 on August 19—its highest point since March. For the month, the Dow increased 80.76 points before closing the session at 3605.98, while the S&P 500 increased 10.72 points to close at 455.23.

The strong performance by stocks nationally spilled over into computer stocks, as the Microtimes Stock Index tacked on 192.28 points to close at 4264.70.

Compaq Computer soared during the monthly period, adding $5.00, or 10.26%, before closing the session at $53.75. Last month, Compaq signed an agreement with Legato Systems Inc. to integrate and resell Legato NetWorker, a network-wide backup and recovery product.

Following the lead of Compaq, Digital Equipment Corporation added $1.38 to its price before closing at $38.88. In a recent news release, Digital announced it will close a manufacturing facility in Kaufbeuren, Germany, which produces magnetic disk drives. The plant will be phased out over the next ten months and will affect about six hundred employees.

On the other hand, Hewlett-Packard trailed behind in the accompanying chart, as that concern fell 88 cents despite reporting third-quarter earnings of $271 million—an increase of 44% from $188 million recorded one year earlier. Revenue for the period also increased 23% to $5 billion from $4 billion recorded one year ago. Analysts were expecting higher earnings and revenues for the company. Hewlett-Packard closed the session at $74.38.

Adobe Systems' rating was recently lowered by analyst Fredric Cohen at Ladeburg, Thalman & Co. to "hold" from "buy." The rating reduction was attributed to PostScript, which is used in printers made by Hewlett-Packard, Apple, and other leading computer manufacturers. Adobe's royalty revenues have declined to below 20% of its target levels due to seasonal fluctuations and maturation in the printer business. Adobe finished the month at $22.13, down $4.38. ■

EXCH	COMPANY		TICKER SYMBOL	CLOSING PRICE 07/22/93	CLOSING PRICE 08/23/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE											
OTC	Adobe		ADBE	26.50	22.13	-4.38	-16.51	22	0.20	0.90	37.00	12.63
OTC	Aldus		ALDC	15.25	17.38	2.13	13.93	67	0.00	0.00	20.75	10.25
OTC	Autodesk		ACAD	44.25	45.50	1.25	2.82	21	0.48	1.05	56.75	38.75
OTC	Borland	(L)	BORL	19.50	20.00	0.50	2.56	–	0.00	0.00	49.00	15.25
OTC	Informix		IFMX	23.00	20.75	-2.25	-9.78	27	0.00	0.00	27.25	9.06
OTC	Lotus	(H)	LOTS	36.88	35.50	-1.38	-3.73	28	0.00	0.00	40.13	14.75
OTC	Microsoft		MSFT	77.63	77.00	-0.63	-0.81	24	0.00	0.00	98.00	68.50
OTC	Novell	(L)	NOVL	23.75	20.13	-3.63	-15.26	22	0.00	0.00	35.25	17.63
OTC	Oracle	(H)	ORCL	49.38	54.75	5.38	10.89	56	0.00	0.00	55.00	15.75
OTC	Software Publishing	(L)	SPCO	6.63	7.00	0.38	5.66	–	0.00	0.00	14.50	5.50
OTC	Symantec		SYMC	11.25	14.75	3.50	31.11	–	0.00	0.00	18.63	5.88
	HARDWARE											
OTC	Apple	(L)	AAPL	26.50	28.38	1.88	7.08	20	0.48	1.69	65.25	25.25
OTC	AST Research		ASTA	15.75	15.13	-0.63	-3.97	–	0.00	0.00	24.25	11.25
NYS	Commodore		CBU	3.50	3.50	0.00	0.00	–	0.00	0.00	9.25	2.50
NYS	Compaq		CPQ	48.75	53.75	5.00	10.26	13	0.00	0.00	61.75	28.38
NYS	Digital Equipment		DEC	37.50	38.88	1.38	3.67	–	0.00	0.00	49.25	30.38
OTC	Dell		DELL	17.13	18.75	1.63	9.49	17	0.00	0.00	49.88	13.50
NYS	Hewlett-Packard		HWP	75.25	74.38	-0.88	-1.16	20	1.00	1.34	89.25	50.25
NYS	IBM	(L)	IBM	43.38	44.38	1.00	2.31	–	1.00	2.25	88.75	40.63
NYS	Silicon Graphics	(H)	SGI	36.88	39.50	2.63	7.12	33	0.00	0.00	39.75	17.63
OTC	Sun Microsystems		SUNW	27.25	26.75	-0.50	-1.83	18	0.00	0.00	41.00	24.00
NYS	Xerox	(L)	XRX	72.38	72.88	0.50	0.69	–	3.00	4.12	88.88	70.25
NYS	Tandy		TAN	28.75	29.25	0.50	1.74	16	0.60	2.05	32.38	22.25
	CPU'S											
NYS	Advanced Micro Devices		AMD	24.38	31.63	7.25	29.74	13	0.00	0.00	32.88	8.38
OTC	Intel	(H)	INTC	50.00	64.25	14.25	28.50	16	0.20	0.31	67.25	27.13
NYS	LSI Logic	(H)	LSI	15.75	18.13	2.38	15.08	–	0.00	0.00	19.25	4.88
NYS	Motorola	(H)	MOT	86.88	96.13	9.25	10.65	35	0.44	0.46	99.13	41.38
	COMMUNICATIONS											
NYS	AT&T		T	63.88	58.00	-5.88	-9.20	19	1.32	2.28	65.00	40.63
NYS	BellSouth Corp.	(H)	BLS	55.88	54.13	-1.75	-3.13	17	2.76	5.10	58.88	46.75
OTC	MCI	(H)	MCIC	28.75	27.38	-1.38	-4.78	22	0.04	0.15	29.88	16.06
NYS	Northern Telecom	(L)	NT	21.50	26.25	4.75	22.09	–	0.36	1.37	46.00	21.38
NYS	Pacific Telesis	(H)	PAC	49.00	51.88	2.88	5.87	24	2.16	4.16	53.38	39.50

Note: Adobe Systems completed a 2-for-1 stock split on 8/10/93

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	20
DECLINES	11
UNCHANGED	1
NEW HIGHS	9
NEW LOWS	7

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Intel	$ 14.25
LARGEST DOLLAR LOSER	AT&T	$ -5.88
LARGEST PERCENTAGE GAINER	Symantec	31.11 %
LARGEST PERCENTAGE LOSER	Adobe	-16.51 %

	CLOSE 07/22/93	CLOSE 08/23/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4072.42	4264.70	192.28	4.72
DOW JONES INDUSTRIAL AVERAGE	3525.22	3605.98	80.76	2.29
STANDARD & POOR'S 500 STOCK INDE	444.51	455.23	10.72	2.41
N.Y.S.E. COMPOSITE	246.26	252.91	6.65	2.70
NASDAQ COMPOSITE	695.52	730.86	35.34	5.08

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
02/05/93	4083.40	3442.14
03/04/93	4127.80	3398.91
04/01/93	4196.89	3439.44
04/29/93	4074.63	3425.12
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98

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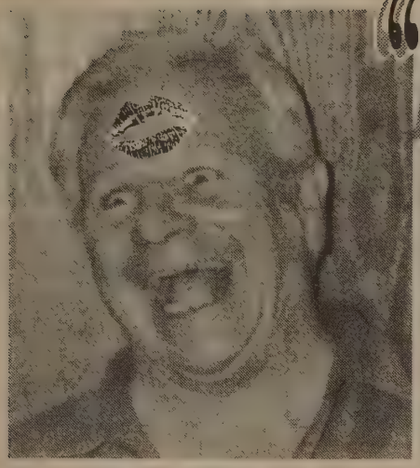

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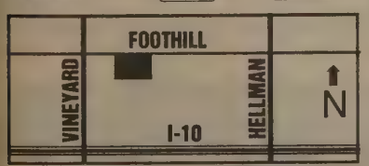

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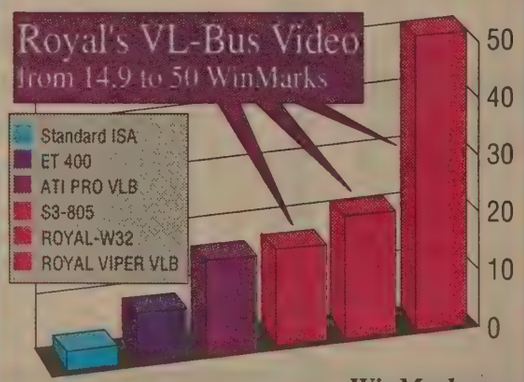

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DTC 2290 EISA IDE	105
DTC 3292 EISA SCSI	310
DTC 3290 EISA SCSI II Exp to 4MB	400
DTC 2270 VLB SCS III	110
Alpha Research VLB IDE Caching	185
Alpha Research EISA SCSI II	300
Alpha Research EISA SCSI II Exp to 16MB	380
Ultrastor 15C IDE Cache Controller	210
Ultrastor 14F SCSI Controller	220
Ultrastor 24F EISA SCSI	360
Ultrastor 34F VESA LB SCSI	280
Adaptec 1522 BK	160
Adaptec 1542 BK	250
Adaptec 1542 CK	275
Adaptec 1542 CK+	340
Adaptec 1742 AK	425
Vesa Local Bus Controller w/ I/O	**45**
VESA LB for 50MHz	50
Orchid VLB Controller	65

MONITORS

14" 1024x768, .39 Dot	$228
14" 1024x768, .28 Dot	258
14" 1024x768, .28 Dot NI	280
14" 1024x768 (Edge to Edge Viewing)	310
CTX 1461 LR	310
CTX 1560 15" 1024x768, .28 Dot	410
CTX 1560 LR	450
CTX 1760 17" 1280x1024, .28 Dot	795
View Sonic 4 14"	275
View Sonic 5E 14"	375
View Sonic 6E 14"	295
View Sonic 6FS 15"	475
View Sonic 7 17"	880
View Sonic 15	495
View Sonic 17	1040
View Sonic 20"	1650
View Sonic 21	1890
Mag 1564 15"	430
Mag 15F 15"	520
Mag 17F 17"	930
NEC 3FGE 15"	625
NEC 4FGE 15"	740
NEC 5FGE 17"	1125
NEC 6FG 20"	2325
KFC 15" Digital Monitor 1280x1024	410
KFC 17" (1280x1024)	790
14" Mono Monitor	105
14" SVGA Mono Monitor	125

KEYBOARDS

Chicony 5311	$25
Lite On/Mitsumi 101 Key	30
Focus 2001	38
Focus 9000 Programmable	60
Keytronic 101 Key	35
Fujitsu 101K 4700	45
Northgate 101 Key	55
Northgate 102 Key	75
Northgate Omni Ultra 130 Key	95

ETHERNET CARDS

Ethernet 16 Bit Generic	$65
Ethernet 16 Bit Novell	139
Intel Ether Express	139
16 Bit Western Digital	195
Ethernet 32 Bit CNET	320
Ethernet 32 Bit Intel	490
Ethernet 32 Bit Vesa Local Bus	390
Artisoft AE-2 Starter Kit	489
Artisoft AE-2 Adapter	220

CD ROM

Panasonic Internal SCSI	$350
Texcel CD ROM Internal SCSI	420
Mitsumi CD ROM Int. IDE	**195**
Toshiba 3401 Int. SCSI	425
Multimedia NEC 84 Upgrade Kit	950
Multimedia NEC 74 Upgrade Kit	1050
Fusion CD 16 Package	495
Royal Super CD Package	395
Multimedia Creative Labs Upgrade Kit Package	595
Multimedia Creative Labs Starter Kit Package	495

ALL CD ROM PACKAGES-CALL FOR DETAILS!

MOUSE

Generic Mouse 3 Button	$18
Logitech Serial	68
Logitech Bus	78
Zenix Cordless Mouse w/Windows 3.1	**55**
Generic Track Ball	35
Logitech Trackball Serial	95
Logitech Trackball Bus	115
Microsoft Serial Mouse (OEM)	50

TAPE BACKUPS

Colorado 120 MB	$155
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Archive 250 MB	170
Archive 525MB SCSI	525
120MB/250MB Tape Cartridges	24/27
Syquest 44MB SCSI Removable Drive	310
Syquest 88MB SCSI Removable Drive	375

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Encyclopedia	52
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King Quest V	25
Loom	25
Lotus 1 2 3	85
MS Windows 3.1	45
Mantis	25
Maria is Missing/World Atlas	28
Microsoft Bookshelf, 7 Titles	69
MicroSoft Works	58
Mixed Up Mother Goose	35
Monkey Island	25
Reference Library	25
Secret Weapons of Luftwaffe	45
Seventh Guest	45
SFX 350 Sound Effects	25
Sherlock Holmes	35
Sleeping Beauty	25
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US Atlas/World Atlas	25
US History	35
Willy Beamish	25
Wing Commander	25
4 Titles CD: US/World Atlas, Typing & Chessmaster	45

SOUND CARDS

Pro Audio Spectrum 16 Bit	$169
Sound Blaster	85
Sound Blaster Pro Basic	165
Sound Blaster Pro 16	189
Sound Galaxy w/2 speakers	95
Pair of Stereo Speakers	20

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RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

SEPTEMBER

September 4 Computer Show & Sale. Ventura County Fairgrounds. MarketPro Shows. Call: (415)388-8893.

September 5 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-685-1400.

September 5 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

September 9–11 CompuExpo '93. Las Vegas Convention Center. UNSC Investment Group. Call: 1-800-822-1229.

September 10–12 San Diego Computer Fair 1993. San Diego. San Diego Computer Society. Call: (619)573-0617.

September 11 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

September 11–12 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

September 12 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

September 13–14 The Touch Of Success: The Direct Marketing Conference For High Tech Marketing Executives. Boston. 21st Century Marketing. Call: 1-800-972-5244.

September 13–17 Innovate '93 Conference And Exhibition. Houston. Compaq Computer Corp. Call: 1-800-235-2133.

September 16–18 Fourth Annual International Acucobol Developers' Conference. San Diego. Acucobol, Inc. Call: (619)689-7220.

September 18 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

September 19 Computer Show & Sale. Antelope Valley Fairgrounds, Lancaster. MarketPro Shows. Call: (415)388-8893.

September 19 Computer Show & Sale. Orange County Fairgrounds, Costa Mesa. Richard James Corp. Call: 1-800-685-1400.

September 20–23 USENIX Symposia: Second Microkernels And Other Kernel Architectures. San Diego. USENIX Association. Call: (714)588-8649.

September 25 Computer Show & Sale. Riverside Convention Center. MarketPro Shows. Call: (415)388-8893.

September 26 ACP Computer Swap Meet. Santa Ana. ACP. Call: (714)558-8813.

September 26 Computer Show & Sale. Civic Auditorium, Oxnard. MarketPro Shows. Call: (415)388-8893.

September 28–29 Electronic Books Conference. New York. Mekler. Call: 1-800-632-5537.

OCTOBER

October 2 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

October 2 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

October 2–17 Electronics Computer Shows—Far East Tour. Commerce Tours International. Call: (415)433-3072.

October 3 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

October 3 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-685-1400.

October 9–10 Computer Show With Computer Training Seminar. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

October 9–10 Computer Swap Meet & Sale. Long Beach. Megabyte Computer Shows. Call: 1-800-745-0266.

October 16 Computer Show & Sale.

Continued

SEPTEMBER 15–18

WINDOWS SOLUTIONS CONFERENCE & EXPOSITION

Santa Clara Convention Center

Seybold Seminars is presenting Windows Solutions, a new conference and exposition designed for professionals whose job is dependent on providing mission-critical computer solutions for their companies. The three-day conference, September15–17, will offer multiple track sessions, allowing attendees to customize the program to fit their needs. The exposition, September 16–18, will showcase over 150 vendors and the latest Windows products in an environment designed to provide you with face-to-face answers to your technical and technology questions. Call: Seybold Seminars, 1-800-433-5200 or (310)457-8391.

OCTOBER 9–10

COMPUTER SHOW

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OCTOBER 9–10

COMPUTER SWAP AND SALE

Long Beach Convention Center

Megabyte Computer Shows is having computer swap meet and sales events at the Long Beach Convention Center, 300 E. Ocean Blvd. Admission is $5 and shows are from 10:00 am to 3:30 pm. Call: 1-800-745-0266.

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September 11 Saturday — **RESEDA** - Sherman Entertainment Center
From 101 Freeway, take Reseda off ramp, turn left (if traveling East) on Reseda Blvd. to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.

September 12 Sunday — **BUENA PARK** - Sequoia Conference Center
Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.

October 2 Saturday — **RESEDA** - Sherman Entertainment Center

October 3 Sunday — **BUENA PARK** - Sequoia Conference Center

October 9 & 10 Saturday & Sunday — **POMONA** - Fairplex (L.A. County Fairgrounds)
Exit Highway 10 at Fairplex Drive. Go North to Mckinley, turn right. Turn Left on White Avenue to Gate 14.

October 30 & 31 Saturday & Sunday — **POMONA** - Fairplex (L.A. County Fairgrounds)

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202265-001	VGA Plus Board	$45
202351-002	486/25E EISA Mbd.	$225
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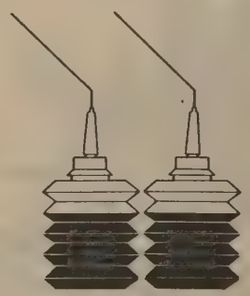

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RESOURCES

Calendar Of Events continued

Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

October 17–20. OS/2 Professional Interchange Conference. Palm Springs. OS/2 Professional. Call: 1-800-GET-OS20.

October 18–22 The Object Conference And Exposition. Boston. DCI. Call: (508)470-3880.

October 19–21 Media Summit '93. New York City. REC. Call: Customer Relations, (203)352-8302.

October 20–23 Seybold San Francisco Conference And Exposition: The Evolving Process Of Communication. San Francisco. Seybold Seminars. Call: 1-800-433-5200, ext. 1010.

October 23–24 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

October 26–28 Common Desktop Environment Developers Conference. San Jose. UniForm Association Call: 1-800-225-4698.

October 30–31 Computer Show With Computer Training Seminar. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

NOVEMBER

November 2–4 Email World: The Mail Enabled Applications Conference & Expo. Santa Clara. DCI. Call: (508)470-3880.

November 6 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

November 7 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

November 20–21 Computer Show With Computer Training Seminar. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

November 28 ACP Computer Swap Meet. Santa Ana. ACP. Call: (714)558-8813.

CLASSES, SEMINARS, AND WORKSHOPS

SEPTEMBER

September 8 High-Speed Windows Applications Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 8–10 User-Oriented Interface Design: Process And Product Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 9–13 Intro To Aldus Freehand Course. Los Angeles. Dept. of the Arts, UCLA Extension. Call: (310)206-1422.

September 10 Intro To Lotus 1-2-3 Class. S. Pasadena. Classes Unlimited. Call: (818)441-5977.

September 14–17 Object-Oriented, Distributed And Intelligent Database Systems Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 17 Info Tech Workshop: Graphics, Text, Voice, And Motion. Monrovia. LA Chapter of ASIS. Call: (818)356-6704.

September 20 AutoCAD Release 12 Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

September 20–21 WordPerfect 6.0 Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

September 20–23 An Intro To C++ Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 21 C Programming & C++ Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

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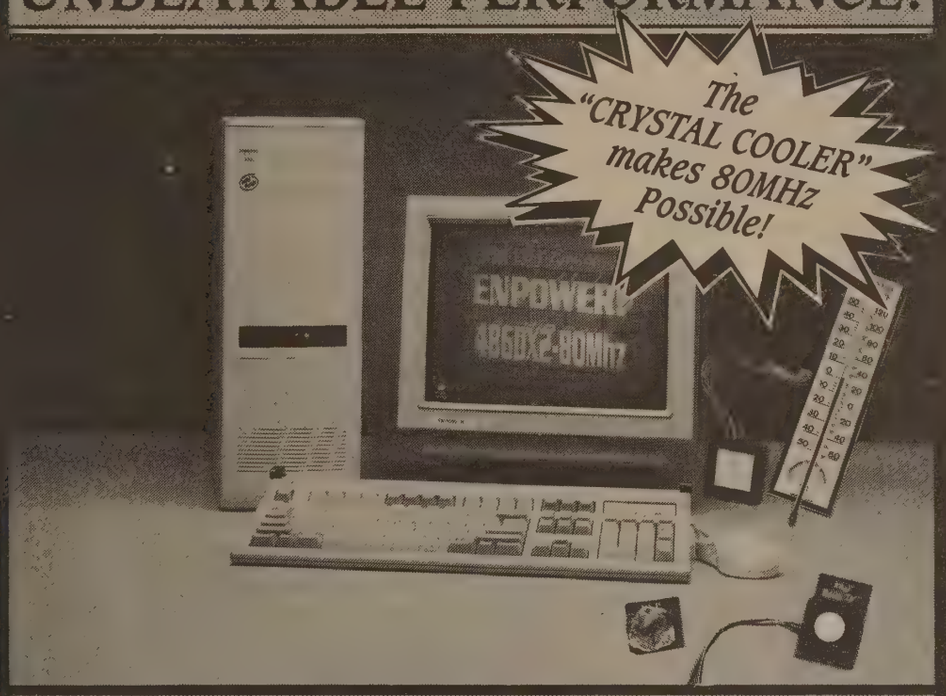

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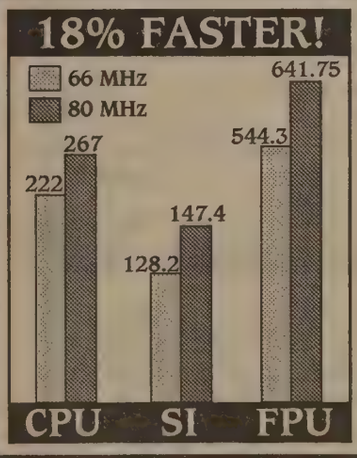

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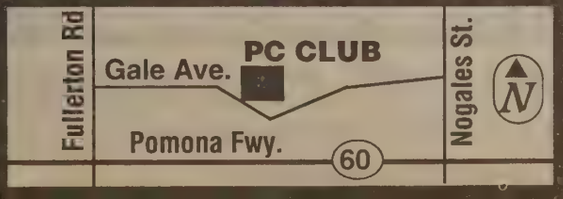

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RESOURCES

Calendar Of Events continued

September 22 Windows 3.1 Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

September 22–24 User-Interface Design For Interactive Multimedia Systems Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 24 DOS & Hard Disk Management Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

September 25 Novell System Manager Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

September 28 Intro To QuarkXPress For Windows Workshop. Los Angeles. UCLA Extension. Call: (310)206-1422.

September 28–29 System Administration Of NetWare Seminar. Newport Beach. Center for Advanced Professional Development. Call: (714)261-0240.

September 28–30 Software Metrics Short Course. Los Angeles. UCLA Extension. Call: (310)825-1047.

September 29 Intermediate QuarkXPress For Windows Workshop. Los Angeles. UCLA Extension. Call: (310)206-1422.

September 30–October 1 Installing, Troubleshooting & Maintaining NetWare Seminar. Newport Beach. Center for Advanced Professional Development. Call: (714)261-0240.

OCTOBER

October 14–15 An Intro To Networking PCs With Novell Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

October 16 The Information Broker's Seminar. Los Angeles. The Information Professionals Institute. Call: (510)649-9743.

October 19 Software Licensing Agreements Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

NOVEMBER

November 2–4 Client-Server Workshop. Los Angeles. DCI. Call: (508)470-3880. Code: L0C9XX.

November 29–December 3 Macintosh Learning Extravaganza: 5 Days Of 144 Workshops. Anaheim. MacAcademy. Call: 1-800-527-1914.

November 30–December 1 Communicating Effectively With Help Desk Customers Seminar. Los Angeles. Help Desk Institute. Call: 1-800-248-5667.

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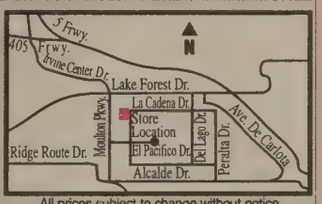

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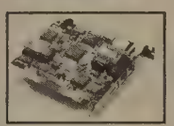

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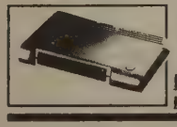

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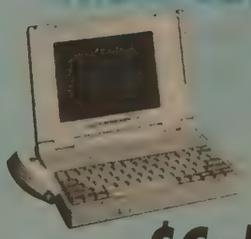

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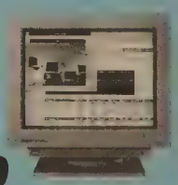

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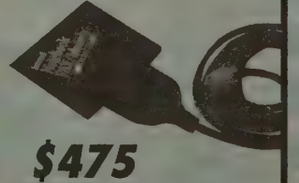

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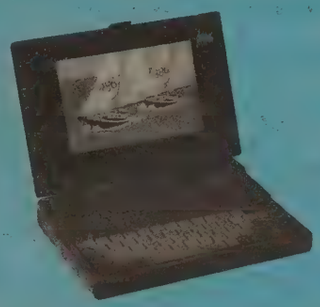

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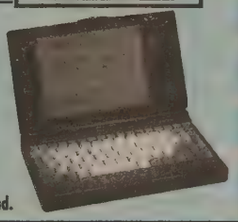

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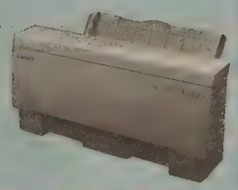

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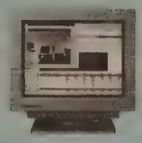

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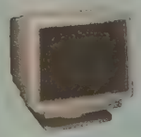

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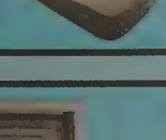

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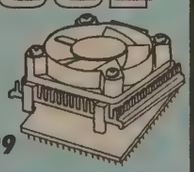

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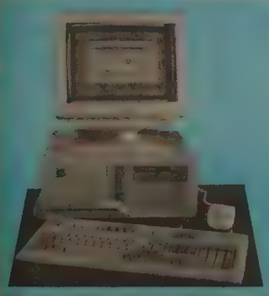

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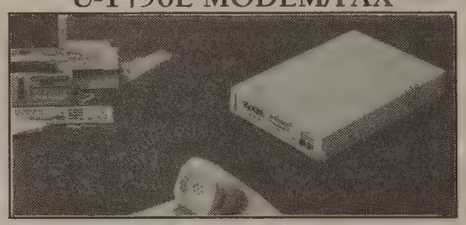

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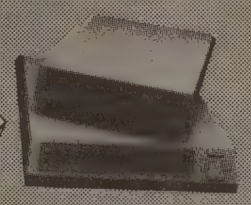

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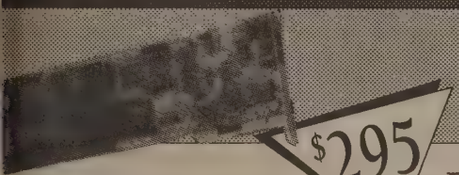

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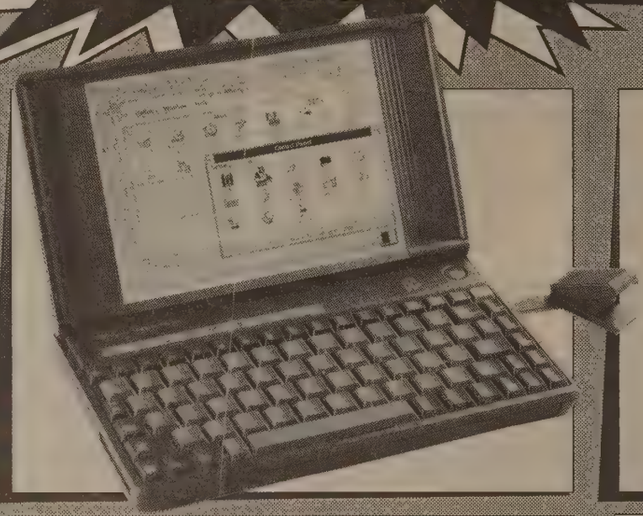

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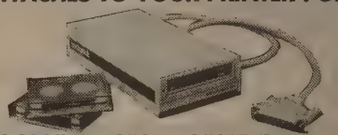

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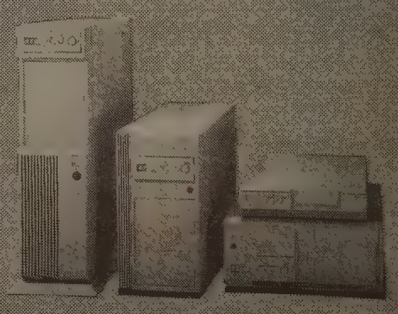

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BBS Spotlight

By John Wolcott

Connecting Down Under

Connecting with a well-appointed BBS can be a very pleasing experience; almost addictive. Full-featured BBSes typically offer such a variety of entertainment that there's something there to please everyone. Whatever features you find particularly alluring, more than just grasping your attention, can become a need. You may find that after a few sessions on a system, you'll need your daily "fix" of modeming. This month's BBS Spotlight features a BBS with many of these addictive amenities.

The Aussie BBS has a very pleasing appearance, particularly if you have ANSI graphics capabilities. Not quite as far away as Australia, the system is located in Baldwin Park. With ten lines supported by various modems at speeds up to 14,400 baud, access to the system is rarely a problem.

New users are granted very limited access to the system. The first thing you encounter is an email message from the sysop. Attached to this welcome message is a download file, entitled "AUSSIE.ZIP," that gives you detailed information about the system as well as subscription information. After reading the welcome message, the system will ask you if you'd like to download the file. (The recommended answer to this prompt is "yes.") After downloading this file, you'll find that about half of your "new user" time allocation has been used. So, log-off and unzip this file for viewing.

Now that you've read the file, you're ready to return to this BBS in an informed manner. You may now log back on and arrange for a subscription. Rates for subscription vary depending upon terms and are outlined in detail in the Aussie file. Subscription may also be arranged by calling a 900 number for a month of unlimited access; of course, with the appropriate 900 call charges applied to your next phone bill. After subscription validation by system operators, all of the system features will be yours.

Reading system bulletins as they are updated is not a matter of choice here. Because sysops were swamped with user questions about information contained in system bulletins (which were commonly ignored by the users), system bulletins are automatically displayed upon log-in. Following the bulletins, you'll be prompted with any outstanding email addressed to you and then greeted with the main menu.

Choices from the main menu include Teleconference, alternate BBS telephone numbers, classified ads, connecting to another of two BBSes, email, online games, a library of files, a user registry, Maillink forums, an information center, and several amusing commands. The main menu will also keep you advised of your membership class and the number of days left, game credits available, minutes used, and minutes you are allowed per call and per day.

Teleconference allows users to chat in an open forum atmosphere. Whatever you type in the Teleconference, all other users

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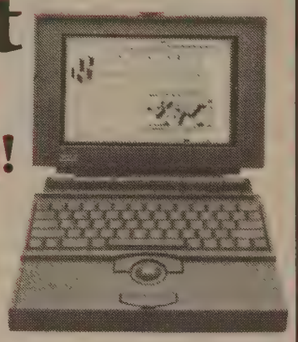

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who are also in Teleconference will see. You may occasionally see lines of text like, "The sysop is laughing his head off at you!" There are a large number of key words to use as commands which allow comments such as this to be sent with a two-word command instead of typing the whole thing out. You might respond with "SLAP SYSOP," which would give him the text message, "NewUser is slapping you silly!" Your screen would prompt you with, "Whap, Whap, Whap!" Help for finding your way around the command structure is available online.

The other BBS numbers choice will give you a listing of all ten phone lines for the system and what type of modems they're connected to. This is useful if you want to know the high-speed numbers for downloading files.

The classified ads section will allow you to view existing classified ads. You may also place an ad as well as modify, delete, or check reader responses to your ad

You may choose to connect to Cancomp BBS or Learning Experience BBS directly from the Dial Out menu. This option amounts to calling another BBS just as though you had dialed directly in. This can be an entertaining feature if you're in the mood to explore.

Electronic mail for this system is very straight-forward. Your mail is easily read from prompts, and the sender has the option of attaching files to the message. A reply to a message is easily generated from prompts on the screen. Sending messages is just as easy from the email menu. The menus and prompts "walk you through" all you'll need to do.

The online games menu is extensive. You can play hangman, tic-tac-toe, enter a backgammon tournament, or even have your bio-rhythms charted. New games include Galactic Empire and Major Goose. You're sure to find something entertaining here.

The files available for download include an IBM compatible library with a complete category list of download topics and an adult file library with adult oriented material. In all, over 18,000 files are available for your downloading pleasure. (This is where the high-speed modem lines come in handy.)

Maillink allows this system to communicate messages worldwide with other systems on Majornet. Topical discussion among users of many different systems is common with this type of message transmission and forum discussion.

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The Aussie BBS appears to be a good value for your subscription dollar. Aussie BBS can be reached by calling (818)337-9701 or (909)598-2502 with the typical modem parameters of 8-N-1. Try it for yourself. You'll be glad you did. ■

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You can update or renew your listings at any time. If yours is missing, send your listing information to:

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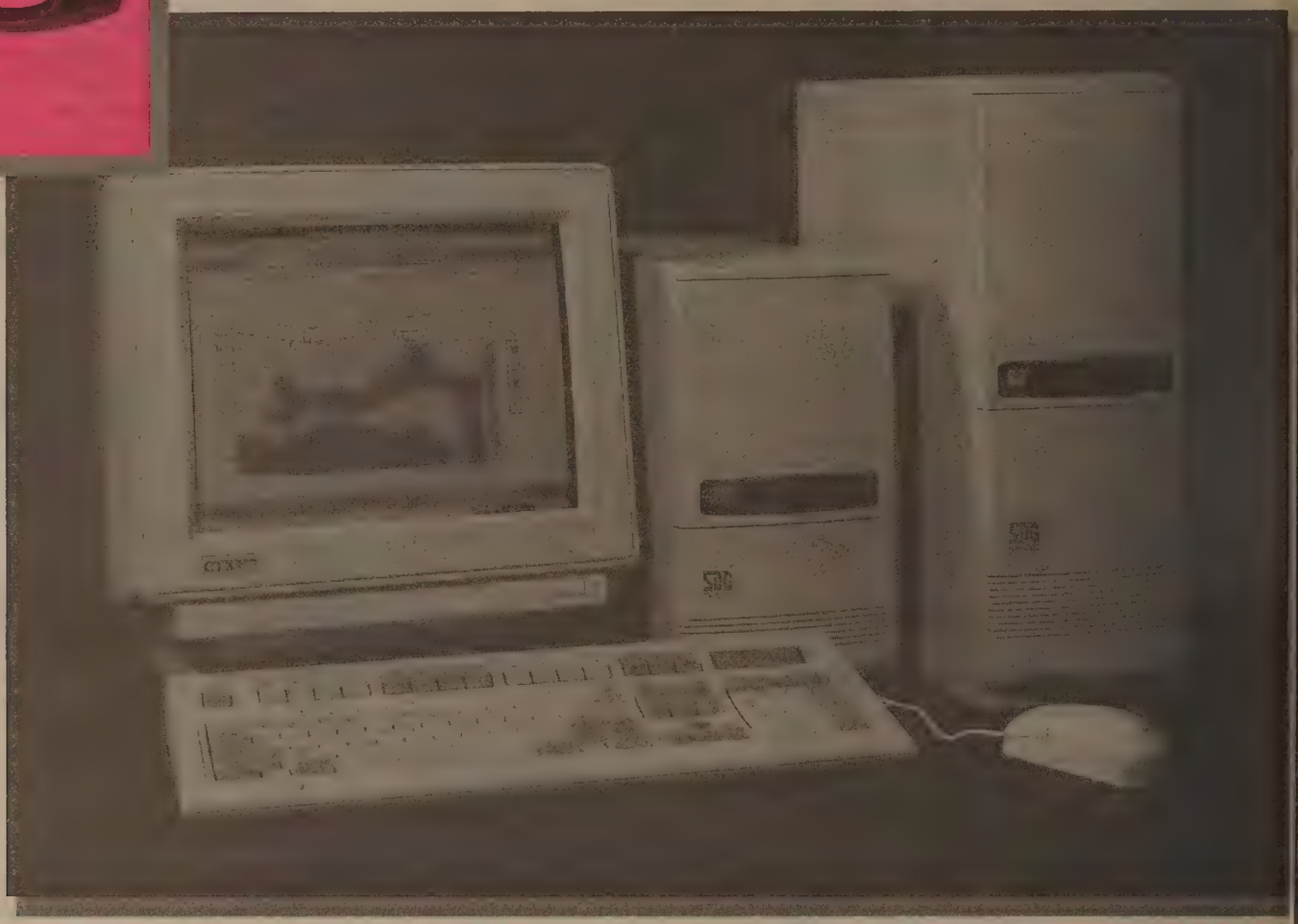

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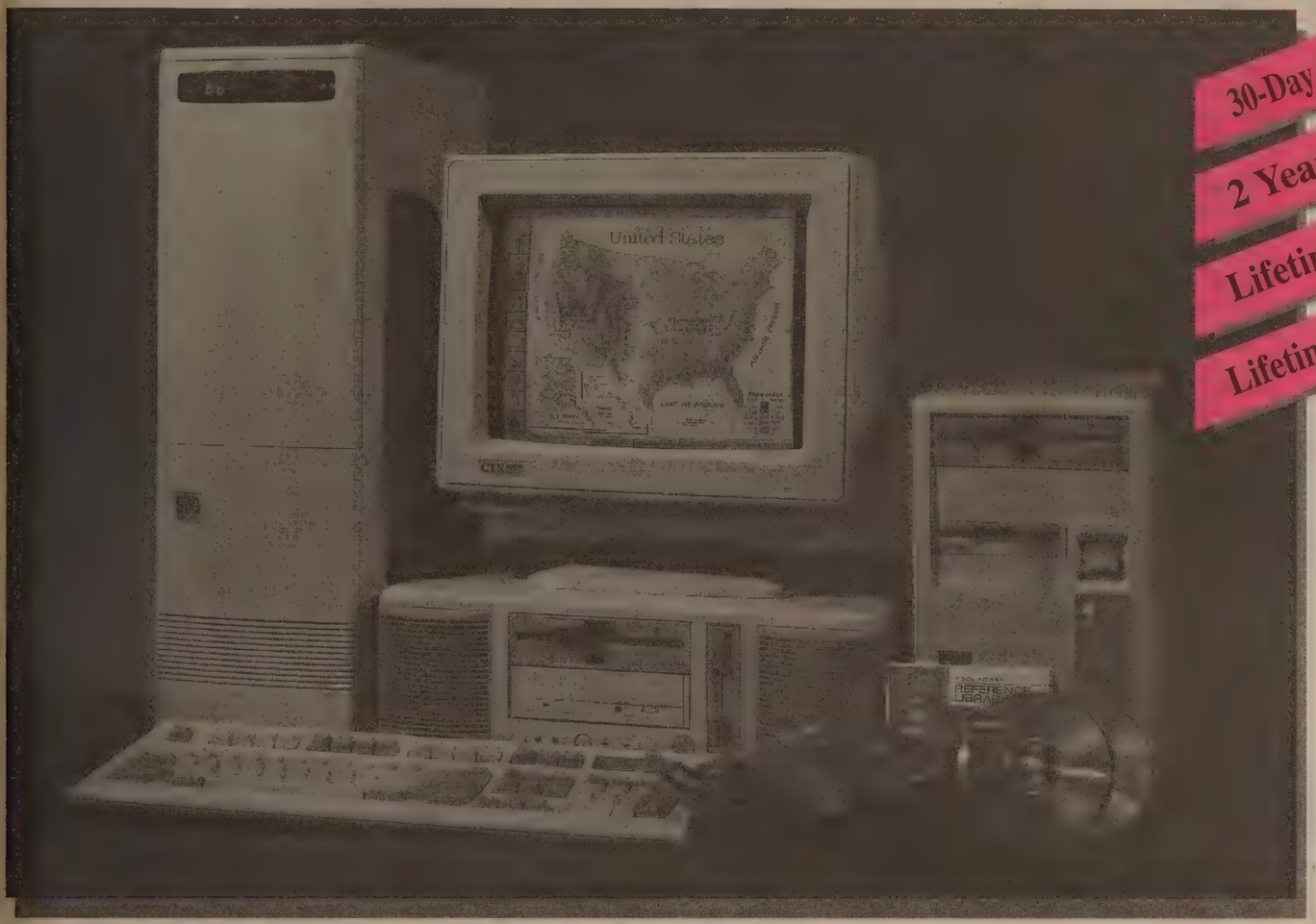

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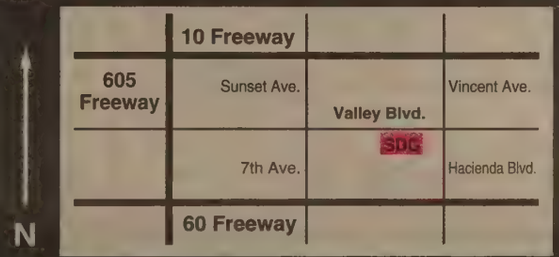

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AMIGA

Amiga User Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, 5373 E. Second St., Belmont Shores (in the Fire Station Bldg.). Call: Larry, (310)429-0752. [Exp. #117.]

ATUG—San Gabriel Valley. Meetings: 3rd Sat., 11:00 am, First S. Baptist Church, 4856 N. Golden W., Temple City. Call: Steve, (818)285-6424. [Exp. #115.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Kip Hammond, (310)390-3010. [Exp. #118.]

South Orange Commodore Klub—SOCK. Meetings: 3rd Sat., 9:00 am, Computer Guild, Ste. 1003, 24001 Via Fabricante, Mission Viejo. New Location. Supports Commodore and Amiga, new users SIG. Call: Don, (714)830-2430. [Exp. #115.]

APPLE

Orange Apple Computer Club. Meetings: 1st Sat., 9:00 am, Orange Coast College, Chemistry Lab. Apple II supported, presentations, and disk of the month. Call: (714)770-1865. [Exp. #115.]

Original Apple Corps, Apple II User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #114.]

ATARI

Atari Computer Association Of Orange County. Meetings: 2nd Sun., 12:30 pm. Fullerton Savings, 12860 Euclid, Garden Grove. Open to the public. Call: Tom Mynar, (714)960-6111, after 7:00 pm. [Exp. #116.]

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative group for Model Railroad applications. Call: (310)430-5433. [Exp. #116.]

South Bay Atari Computer Enthusiasts (SBACE). Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active in all user interests since 1981. Call: (310)375-4839 (10am–10pm). [Exp. #117.]

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CLARISWORKS

ClarisWorks User Group. Supports both Macintosh and Windows. PO Box 701070, Plymouth, MI 48170. Call: (313)454-1969. [Exp. #117.]

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Clipper User Group Of Orange County. Meetings: 4th Thurs., 7:00 pm, Irvine Host Hotel, 1717 E. Dyer Rd., Santa Ana. Call: Bruce Jones, (714)960-9680. [Exp. #118.]

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Aldus/DTP Users Group. Share ideas and gain knowledge about the standard page layout and graphic design programs on the market. Call: Dave Casad, (310)370-6269. [Exp. #115.]

Southern California Ventura Publisher User Group (SC–VPUG). Meetings: Last Tues., 7:00 pm, 401 N. Brand, Glendale, Glendale Federal Bank Building. Product demos, Q&As, library resources. Call: (818)955-5830. [Exp. #115.]

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IBM & COMPATIBLES

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Christ King Lutheran, 2706 W. 182nd St., Torrance. Visitors welcome. Call: (310)329-2804. [Exp. #115.]

Long Beach IBM PC And Compatibles User Group.

Continued on page 155

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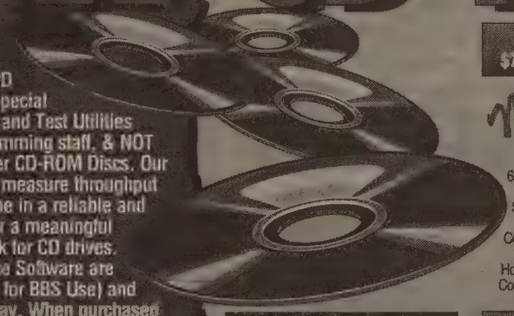

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Cool Video Tools

Amiga-Based Capture, Editing, And More

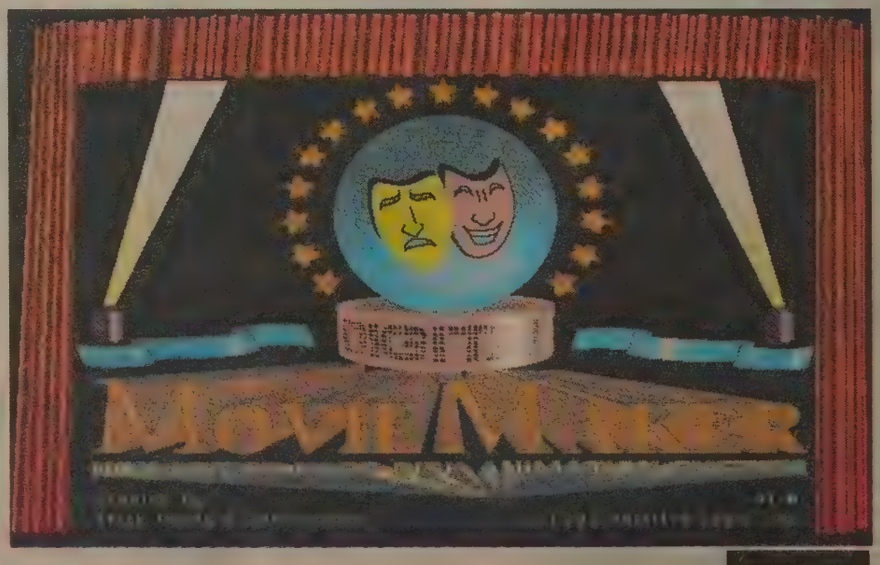
BY DOUGLAS J. NAKAKIHARA

A lot of people believe that capturing moving video on a desktop PC is a fairly easy thing to do. Just install a video capture board in your PC, connect the thing to your video source, and click the record button. Just like a VCR, right?

Well, not quite.

The problem lies in data transfer rates. Depending on file format, a single full frame of video is at least one-half megabyte in size. So one second of video, thirty frames, is about 15MB of data.

A PC normally can't transfer that much data to a hard drive that quickly. Saving the data to RAM is an alternative, but cost-prohibitive for anything more than a few seconds. To compensate, most boards capture less than a full frame of video. Until some sort of hardware compression like JPEG becomes affordable, capturing full-



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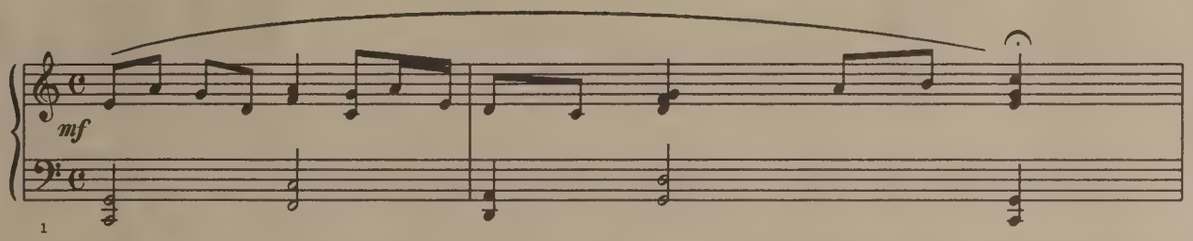

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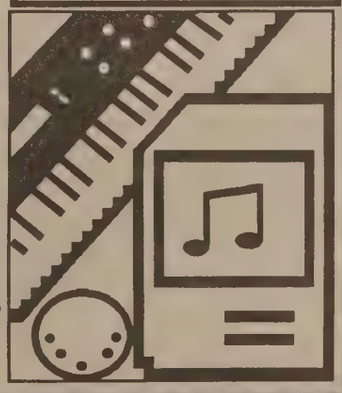

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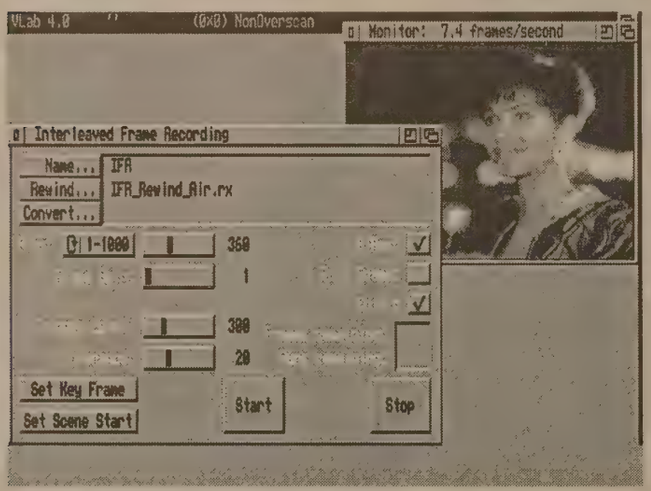
frame video at 30fps appears just a dream for the average desktop videographer.

THE VLAB

But wait.

MacroSystemUS's VLab card for the Commodore Amiga can do 30fps full-frame video capture. Perhaps even more astonishing: You can even use a cheap consumer-grade VCR as your video source.

VLab accomplishes this amazing feat using its innovative Interleaved Frame Recording (IFR) technique. Basically the VLab captures frames as fast as your Amiga can do it. By making multiple passes at the video source (tape or laserdisc), VLab automatically captures more and more frames. For example, on the first pass it might capture frames 1, 16, 31,... The second time around, it might pick up frames 2, 17, 32,... As you can see, ultimately, all thirty frames for each second can be captured! In this example, it would take fifteen passes to capture all of the frames.



The secret to IFR is the selection of a Keyframe, which provides VLab with a point of reference on your video source. Once the Keyframe has been identified, VLab only needs to know how many seconds after the Keyframe it should wait before capturing frames. When VLab is capturing frames, it knows, based on time, which frames it needs to capture—accuracy to a thirtieth of a second is child's play for a computer. A Keyframe seems to occur whenever there is an abrupt change in the video signal—the camera cutting to a different location, or to a close-up of an actor.

The IFR process basically works like this. First you put your VCR in play mode and click on VLab's Find Keyframe button. VLab will let you know when a Keyframe, which must precede the start of your scene, is found. (If it isn't, simply start a little farther back on the tape and try again.) As soon as your scene comes up, click on the Start Scene button. Now all you need to do is click the Start button, rewind the tape past the Keyframe, and play the tape again. Each time VLab finishes a pass of capturing frames, you must rewind and play the tape again.

The total number of captured frames is selectable by the user. If you're capturing at 30fps, just multiply the length of your scene in seconds by thirty. To improve capturing speed and decrease storage requirements, you can reduce the capture resolution or capture in black-and-white. When doing IFR, make sure you disable your screen saver as it may throw VLab's timing off and cause the wrong frames to be captured.

There are also provisions for automating the rewinding process. I highly recommend a terrific product called AirLink by Geodesic Designs. This is an inexpensive infrared (IR) universal remote control for the Amiga. Example ARexx scripts to control AirLink are already included with the VLab software. AirLink can automatically rewind your tape past the Keyframe and then put your VCR back into the play mode, at the end of each IFR pass! Essentially, once you've set up the IFR parameters, you can click a button and walk away. AirLink will also work with camcorders, laserdiscs, etc., as long as they can be controlled with an IR remote.

You're going to need a large hard disk to store all of the frames you capture. Although IFR initially saves frames in a compact YUV format, at 30fps, the storage requirements can really add up. I'm hoping that a provision to convert the captured images to a smaller file format after each IFR pass, thus reducing overall storage requirements, will be added in the future.

For the average user, 30fps may be overkill. The storage requirements alone may discourage its use. A more manageable frame rate is 15fps. Obviously, motion will not be as smooth as it is at 30fps, but it's not annoying.

In addition to IFR, VLab will also capture a sequence of frames at up to 6fps, somewhat like making a single IFR pass at a video source. However, the sequence-capture has a little more control over what is captured. A nice feature is that you have the option of using a resolution of one-half, a third, or a quarter of the screen. This can significantly reduce storage requirements. Obviously, VLab won't even break a sweat capturing a single frame of video. Individual frames can be saved in any Amiga format including 24-bit IFF and AGA.

VLab has loads of other features including extensive ARexx support. You can also monitor the incoming video source in greyscale in a movable window. Video played fairly smoothly in this window on my A3000. You can't see much detail, so depending on your needs you might want to use a signal splitter and watch the video source on a separate monitor. Real-time color, contrast, luminance, and gamma controls are included, as well as luminance, chromanance, and noise filters.

VLab fits into any Zorro II/III slot and does not require the video slot. The VLab Y/C version includes two RCA video inputs plus a Y/C connector for Hi-8 and SVHS video sources. Inputs are software selectable. An external version is available for the A500, A600, and A1200.

WHAT CAN I DO WITH IT?

Applications for the VLab are only limited by your imagination.

For example, most desktop video users are limited to morphing—the current "hot" video effect—one static image to another. With VLab you can now generate the images needed for moving morphs (i.e., the source and target images are moving). Examples of moving morphs can be seen in the movie *Terminator 2* and Michael Jackson's *Black or White* music video.

For the 3-D rendering people, how about the ability to wrap moving video onto your objects! Computer-aided presentations could include video segments without the need for VCRs or laserdiscs. VLab could provide source images for rotoscoping (painting on frames by

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VLab, $499.95
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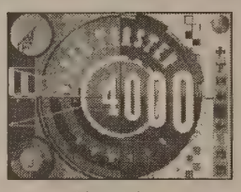

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hand). A nonlinear digital editing system could also be designed around VLab.

Bottom line: The ability to affordably capture video at 30fps is going to open whole new worlds to desktop video.

THE VLAB-RETINA TEAM

When the VLab is teamed with MacroSystemUS's Retina display card, its features are enhanced. The video source can be monitored on a Retina display in 16-bit color. There is a noticeable delay in the display update, but it does give you a better idea of what will ultimately be captured.

Also, Retina comes with a program called Makerace that will compile the captured images with sound into an animation playable on the Retina. With a VGA video encoder, it should be a fairly simple operation to get the Retina output to videotape. On my Amiga 3000, I was able to play a 320 x 200 animation with sound using a 16-bit display at about 15fps. For even faster playback, read on!

A MATCH MADE IN HEAVEN

MovieMaker ($895 list) from Interactive Video Systems is a nonlinear digital video and audio editing system that comes with its own 16-bit stereo sound card.

MovieMaker provides a way to arrange and play VLab-captured frames full-screen at 30fps, with 16-bit sound to boot! MovieMaker works very nicely in an Amiga 3000 and should work better in an Amiga 4000, if it has a Zorro III SCSI controller (currently a rare species). MovieMaker operates best with certain hard drive models so IVS also offers it bundled with an approved hard drive.

Although MovieMaker's output is not broadcast-quality, it is more than adequate for home and industrial use. MovieMaker would also be valuable in a professional preproduction environment. Quick-rendered 3-D animations could be edited and tested with an audio track before being rendered in broadcast-quality form.

Using VLab's IFR, I captured several seconds of video. I also digitized the audio using AES, the audio software that comes with MovieMaker. Then using ADPro, I converted the captured YUV images to DCTV format. Incidentally, ASDG's product ProControl, a front-end for ADPro, made this a very easy task and saved me the trouble of writing my own ARexx script.

Next I imported the DCTV files into the MovieMaker hard disk

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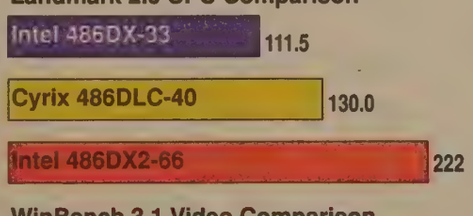
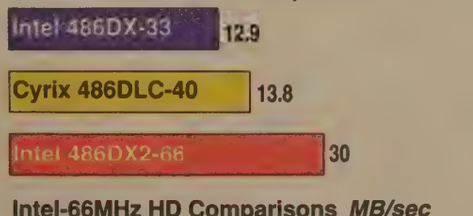
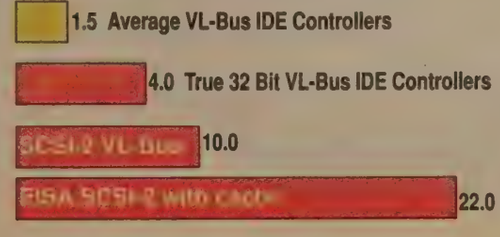


WinBench 3.1 Video Comparison



Intel-66MHz HD Comparisons *MB/sec*



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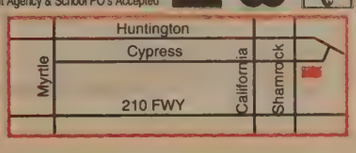

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partition. (MovieMaker requires its own partition.) It took a couple of tries to get the audio synced properly, but the resulting playback was incredible!

Using MovieMaker's word processor-like editing functions, I was able to manipulate my captured video in nearly unlimited fashion. Max Headroom stutter effects were easy as pie to do. This VLab-MovieMaker-DCTV setup seems like a natural for doing MTV-style music videos.

Although MovieMaker's output is not broadcast-quality, it is more than adequate for home and industrial use. MovieMaker would also be valuable in a professional preproduction environment. Quick-rendered 3-D animations could be edited and tested with an audio track before being rendered in broadcast-quality form. Also, storyboarding would be a breeze with MovieMaker using either static or animated sequences.

MovieMaker needs about 100MB per minute of playback. I would estimate that for serious work, you'll need at least a 1GB hard drive. Remember, the original source files have to also exist before they are transferred to the MovieMaker partition. Fortunately, 1GB drives have become somewhat affordable lately. Note that MovieMaker does not require you to dedicate the entire drive, it only needs a partition.

THAT'S A WRAP

At current street prices, a VLab-AirLink-MovieMaker-DCTV package will cost you around $1500. If you need a hard drive, you'll have to add that into the cost too. This may sound expensive, but I am not aware of anything on any computer platform that will match the performance and flexibility of this set up—at least in this price range.

AIRLINK

I just couldn't end this article without mentioning a little bit more about AirLink. By itself, this is an awesome device. It acts as a programmable universal IR remote. All you do is draw a picture of your remote using any paint program (you only need to include the functions you will use). Then you point your remote at the AirLink device, which plugs into the joystick port, and record the IR signals one at a time. Each recorded signal can be associated with any button in your picture. The AirLink's IR LED can be triggered by your mouse, ARexx, user-defined hot keys, serial and parallel port data, and MIDI events.

With AirLink, all IR-remote-controlled devices—laserdiscs, TVs, VCRs, stereos, CD players, etc.—can be at your beck and call. You will no longer be limited to controlling only those devices that have serial port access. AirLink is perfect for multimedia presentations.

You can even trigger other events beside IR, including sending data out the MIDI, serial and parallel ports, executing ARexx commands, emulating keystrokes and mouse clicks, and executing programs. It is also possible to add eight additional IR LEDs using an adapter connected to the parallel port! An upcoming version of the software will allow you to open an AirLink control window on any public screen. With this, you can control your VCR and be doing VLab operations, all from the same screen! ■

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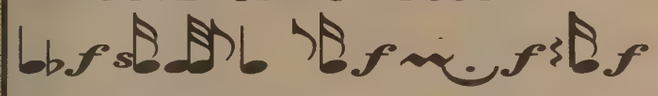

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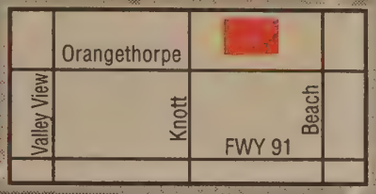

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Enter Indy

Silicon Graphics Unveils Powerful, Affordable Workstation

BY TONY REVEAUX

It's become a cliché that the continuing evolution of computer technology will eventually make workstation-class power affordable. Sun's SPARCstation and Apple's Quadra series have already delivered more power to the desktop than a roomful of wafers could do a couple of decades ago; now, Silicon Graphics' new Indy marks one more big step in the price/performance odyssey.

For $4,995, the entry-level system delivers a 15" color monitor, keyboard, mouse, digital color camera and virtual 24-bit graphics, all in a diskless configuration powered by a 100MHz MIPS R4000PC processor. (For true functionality, you'll need to either add a large hard disk or connect to a network.) The Indy comes with Indigo Magic, the user-friendly operating environment, plus a full suite of digital media software tools and—a games CD-ROM. Various memory, storage, input and computational upgrade paths are available.

In general, the thirteen hundred applications currently available on the SGI platform reflect the markets in which the company has historically been strongest—CAD/CAM, CASE, architecture, chemistry, database management, film and video production, photo retouching, technical publishing, and training—rather than more generic personal productivity.

However, for technical or creative professionals attracted by Indy's power but reluctant to abandon their existing Mac or PC applications, all is not lost. The Indy accepts PC and Mac 3.5" floppies and third-party emulation packages (SoftPC from Insignia Solutions, Mac emulation from Quorum). While even the best of emulators causes a significant performance loss over native mode, SGI maintains that the R4000's speed is sufficient to more than offset the emulator's inefficiencies. (While the demos

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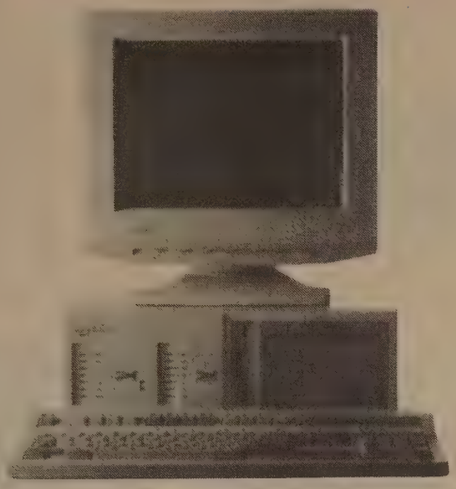

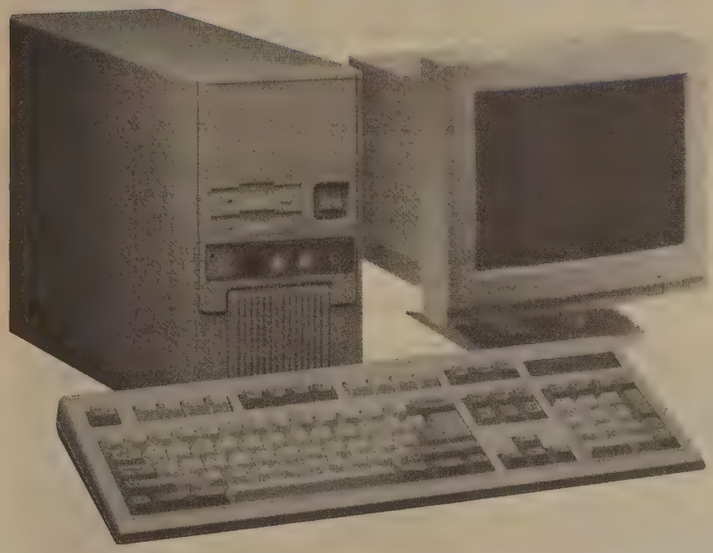

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Sources: 486/66DX2 Review PC Magazine January 26, 1993.

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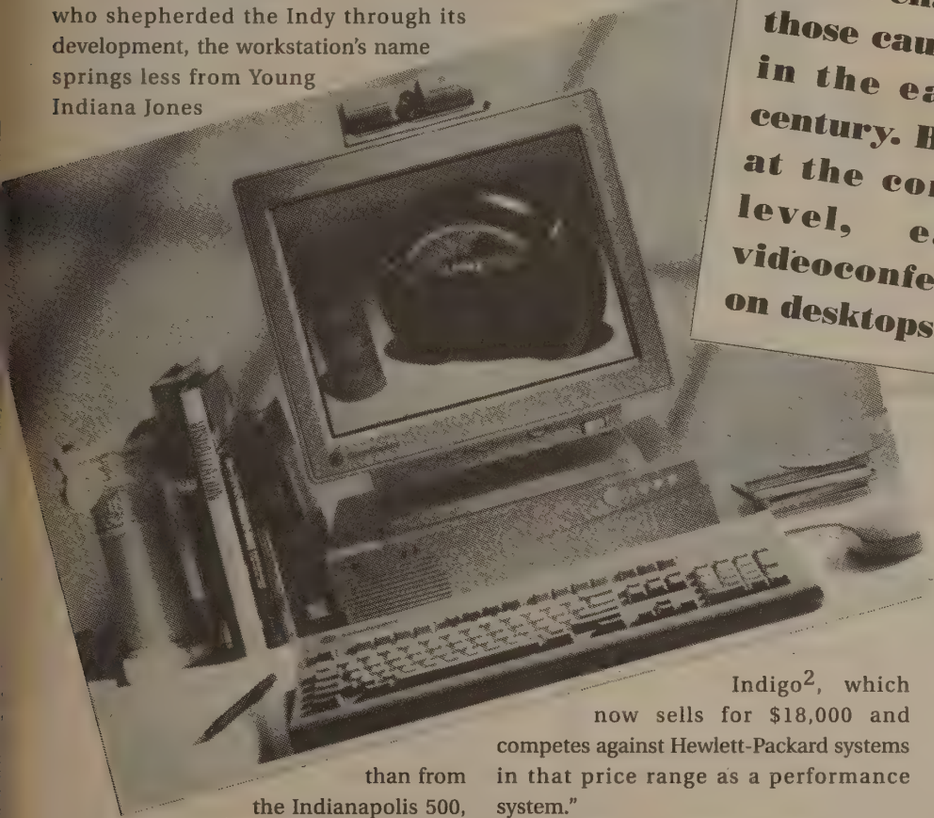
that we saw looked very impressive, serious shoppers would certainly want to test the performance of their particular software, working through all the features and choices of, say, Macromedia Director or Harvard Graphics.)

BEYOND INDIGO

According to Scott Bonham, Product marketing manager, Digital Sight & Sound, who shepherded the Indy through its development, the workstation's name springs less from Young Indiana Jones than from the Indianapolis 500, and also, of course, from SGI's Indigo^2 graphics workstation line. But there's more to Indy than an econobox version of the Indigo^2 configuration.



"Indy," Bonham explains, "is not another version of the Indigo; it is a new product. Indy is a result of a new manufacturing process. We've got higher levels of integration of our ASICS chip technology and VSLI design principles. What we do every two years is basically take a generation of technology and condense it to high levels of integration, so we have reached cost-effectiveness due to that, and through the higher sales volumes that we know we are going to achieve. On Indy, for example, the R&D is actually done earlier on other products. That allows us to get to market sooner. We don't have to debug as much, and we just make it smaller."

"It's part of the Indigo family—but in some ways it's gone way past Indigo; Indigo doesn't have the expanded features, such as the video capabilities. Indy just doesn't have the 3-D graphics performance that Indigo has. The audio subsystem we've put in Indy is the same one that is in Indigo^2, which is a higher-end system. We took a lot of the elements of Indigo^2, which now sells for $18,000 and competes against Hewlett-Packard systems in that price range as a performance system."

As for Indy's positioning with regard to its pricier relatives: "Our positioning of Indigo^2 was extreme performance in graphics and speed," says Bonham. "So, for Indy, we kept the Indigo^2's system bus, and a lot of the other hardware there, and just stuck it in Indy. This speaks to the price reduction seen in this machine—we didn't have to design Indy from the ground up. We took a lot of the chips from higher-end systems.

"What you're getting in Indy is higher-end performance; but at the same time, we have had to be careful not to cannibalize Indigo^2 sales. So we have to be very clear on how we differentiate the two products.

"Indy is really addressing the 2-D market, and Indigo^2 really met the 3-D solids market. While Indy is a 3-D-capable machine, its 3-D work is supported by the CPU and memory. So Indy has a soft Z-buffer, for example, while Indigo^2 has a hardware Z-buffer in most of its graphics configurations. That allows you to get the real 3-D solids modeling performance that the Indigo^2 creates and delivers.

"In the short term, if you know that you want real solid 3-D modeling, you will be directed towards an Indigo^2 purchase. Indy does have some 3-D capabilities. It has all the feature set of the Indigo^2; it just lacks its performance. So if you are looking at playback, or just want to pull up a 3-D image that was created on an Indigo^2, you can do that on an Indy. For just simple 3-D stuff, Indy's fine, but when you really want to get into serious 3-D, then it's definitely one of the configurations of the Indigo^2. We designed the Indy so that it has a long life, and there are removable graphics cards that go from 8-bit to 24-bit graphics. It's not inconceivable that we could have something here in the future that has a hardware Z-buffer."

Videoconferencing will cause social changes as profound as those caused by the telephone in the earlier part of this century. Before it is available at the common videophone level, easy single-user videoconferencing will start on desktops.

Who are Indy's competitors in the marketplace today? "Indy has a complex marketing problem," says Bonham. "It's so powerful, in so many different ways, that it could be in a number of markets, such as 2-D CAD. In that market we will be competing against Hewlett-Packard and Sun Microsystems in the lower-end workstations, and high-end PCs. In the imaging and digital media markets, we will really be competing against high-end Macintoshes.

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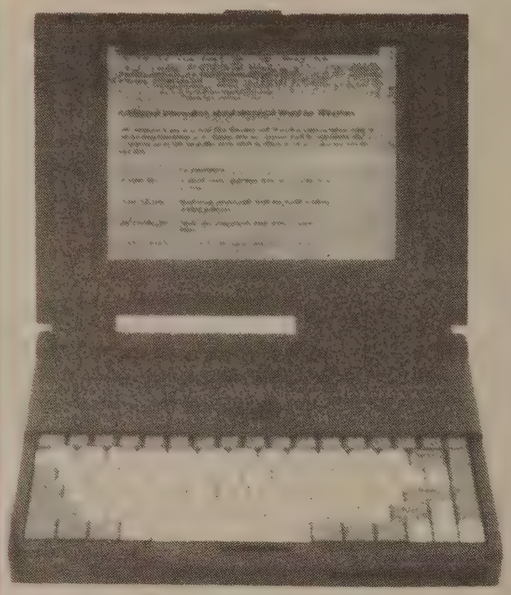

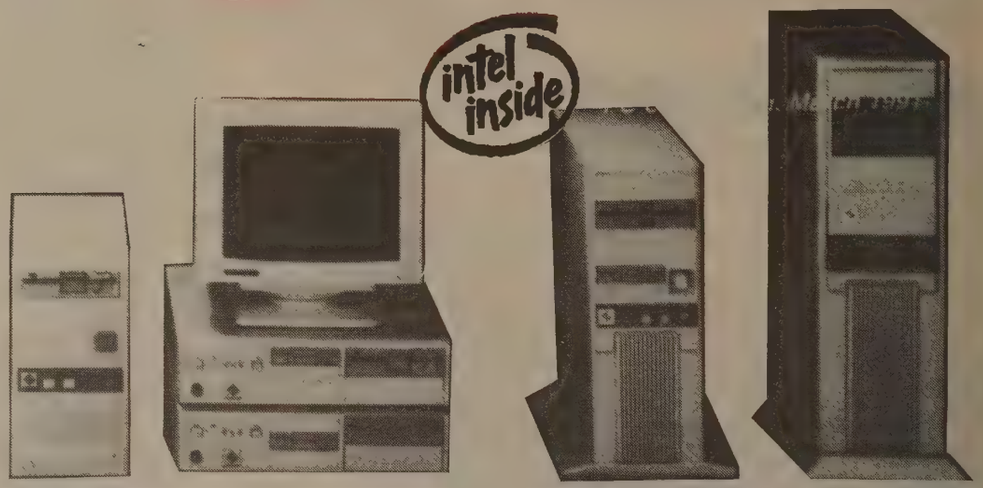

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their production process?

"People will get an Indy in house and use its processing power as a compute server for doing rendering," predicts Bonham, "such as with Pixar's RenderMan for the Mac. Indy is a workstation with a very robust operating system that can do multitasking. You can actually have Indy operating as the server—compute server, render server, print server, file server—and a workstation at the same time. We have applications from third-party vendors that allow an Indy to plug into a Mac network, so that it can either be a client or a server in that environment. Also for a PC environment. It can receive floppies from a Mac, and drivers read the HFS file system or PC system."

DESKTOP VIDEOCONFERENCING—HERE AT LAST:

Both Silicon Graphics and Apple Computer are at the forefront of personal computing in recognizing the need for practical desktop videoconferencing. The Indy comes bundled with SGI's IndyCam, plus the hardware and software to support videoconferencing. Apple's new audiovisual (AV) Macs will be shipping in volume at about the same time as the Indys—in the fourth quarter of this year. Both the 40MHz 68040 Quadra 800AV and the 25MHz 68040 Centris 660AV will come bundled with The Electronic Studio's ES.F2F, a videoconferencing program based on the machines' resident Apple Talk, and pushed along by the Macs' new 66MHz AT&T digital signal processor (DSP).

SGI's bundling of a proprietary digital color video camera in a low-cost system like Indy bespeaks a very serious bet on the future of desktop video and videoconferencing.

The IndyCam is a very robust monitor-top digital camera, based on a previous model from Teleview Research, that provides computer control over shutter speed, brightness and color balance on a circuit board about the size of a credit card. It includes a built-in analog microphone.

Explains Bonham, "We took the Teleview, but threw away the analog circuit. That reduces the cost, and it's simpler with digital-only. The datapath goes from the CCD (charge-coupled device) from the camera to the Indy's video-in circuitry, which sits on the system bus. The independent video bus runs at 267-Mbits per second, which allows you to take full NTSC color into memory at thirty frames per second (full-motion video); we have such a wide bandwidth at that point, the CPU can do some processing to it. That datapath is also great because we also provide two analog connectors on the back of the machine—S-Video and Composite with NTSC and PAL support—and they provide a path that goes from the analog world to the digital domain. We can switch between analog and digital input in real time, and will soon have the capability to simultaneously display both analog and digital display on the screen in separate windows."

By first quarter 1994, SGI's video-conferencing software application will be available for the Indy. Videoconferencing will cause social changes as profound as those caused by the telephone in the earlier part of this century. Before it is available at the common videophone level, easy single-user videoconferencing will start on desktops.

The IndyCam's design reflects some insight into human techno-shock. As the videophone moves into the cubicle and the home, there's a new awareness of visual vulnerability and privacy issues driving user resistance to the technology. There will be moments when a user will want to communicate in "voice only," so videoconferencing is made optional—the camera can be simply turned on or off, with an indicator light signaling its status. The IndyCam has a sliding cover on the shell, which hides the lens in a reassuringly physical way.

With the SGI Indy and the Mac AVs, videoconferencing is coming within arm's reach. It will certainly put a new face on computer dating. ■

Text: The Ultimate VR Tool?

An Electronic Interview With Snow Crash *Author Neal Stephenson*

BY MARY EISENHART

Snow Crash, one of the year's biggest science fiction bestsellers, postulates a physical world populated with characters jacked into a virtual world called the Metaverse. Intelligent software agents, Mafia dons, Sumerian deities, communications tycoons thrash musicians, skateboard messengers, and fearless programmers clash and collaborate in a bizarre but all-too-plausible universe of technoalienation. Along the way, the reader is invited to contemplate computer viruses, media-based mind control, privacy protection, Technology As Force For Good/Evil, and other timely and scary issues.

Author and programmer Neal Stephenson originally envisioned *Snow Crash* as a digital adventure before hitting a few technological walls and going the book route instead. In the book's Afterword he touches on the project's evolution from vision to text, and hints at the cross-fertilization of the computer and science fiction communities. The Internet, appropriately enough, furnished a medium for asking him to elaborate on these themes.

You suggested in the book's Afterword that *Snow Crash* was initially envisioned as an Interactive Multimedia Experience, or at least an Interactive Graphics Experience. Why did this turn out to be unfeasible?

The plan was to use a Mac to generate the graphics for a graphic novel, with possible extension to interactive media later on. The hard part about doing a graphic novel is getting the faces right (that's why comic book superheroes wear masks). My partner Tony Sheeder, a Washington, D.C., painter, and I rigged up a system where we'd videotape actors acting out scenes, use a frame grabber to digitize individual frames, then incorporate them into the graphics using commercial color paint software and some proprietary image processing software that I wrote.

The Mac II, which was state of the art at that time, wasn't fast enough to do image processing, so I installed a Transputer card and wrote the image processing back end in occam 2 and the user interface front end in Object Pascal, later C++, under MacApp. Later, as we got interested in other media besides paper, I extended the system to do frame-by-frame image processing, interfacing it to a 3/4" VTR through a black box called a BCD-5000.

In the end all of this stuff actually worked, and we put together some two-page spreads which we schlepped around New York trying to interest various publishers. The problems were that:

(1) Our garage-grade videotape wasn't good enough to get decent image quality and we realized we'd have to shoot real video, complete with hair, makeup, costumes, lighting, and rented cameras. The budget skyrocketed.

(2) All the publishers who looked at this stuff thought it looked very nice, but after that their eyes glazed over *real* fast. It was just a little too out-of-left-field at that time. This was long before digital media had become a buzzword.

You've said in the acknowledgements for *Snow Crash* that in constructing the Metaverse, you were influenced by the Apple Human Interface Guidelines. Can you elaborate on that a bit?

The whole Metaverse thing germinated in idle discussion between me and a friend of mine named Jaime Taaffe, when we were speculating on how the Mac desktop metaphor might be extended into three dimensions. For starters we were just talking about replacing the desktop with a full-fledged virtual office, which is an idea that many people have come up with independently. After that I started extending the idea, trying to imagine how a commercially viable virtual reality might be designed.

The basic idea behind the AHIG is that you shouldn't mix your metaphors, which is also an important principle in literary style. So in the Metaverse, you can't teleport from place to place—the virtual space behaves as much as possible like a real space. Some techies don't like this, but the Metaverse isn't made for techies—it's a deliberately commercialized version, designed for mass consumption, and the masses are more comfortable with a virtual space that behaves like the universe they're familiar with.

You're both a programmer and an author—did you get into both at the same time and did the two activities evolve more or less in parallel?

I didn't do any serious fiction writing until I was about 20 years old. I started programming when I was 14. My school had a teletype with an old rubber-cup modem that enabled us to hook up with the mainframe at a local university. I'd punch BASIC programs on paper tape, feed them in, and run them. When I was in college I coded in FORTRAN and PL/1, sometimes as part of academic assignments and sometimes just for the hell of it. When the Mac came out in '84, I bought the original 128K model and started programming it in Pascal as soon as a compiler became available. As the Mac got bigger and faster I got better hardware and worked up to MPW Pascal, then Object Pascal with MacApp, then C++. At the moment I'd rather use Lisp than anything else.

The relationship between writing fiction and coding has mostly been pretty tenuous. I either do one or the other, rarely both at the same time. When I've been heavily involved with a writing project, it helps clear my head to dive into some coding, and vice versa. *Snow Crash* was an effort to merge both interests.

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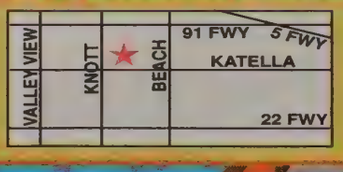

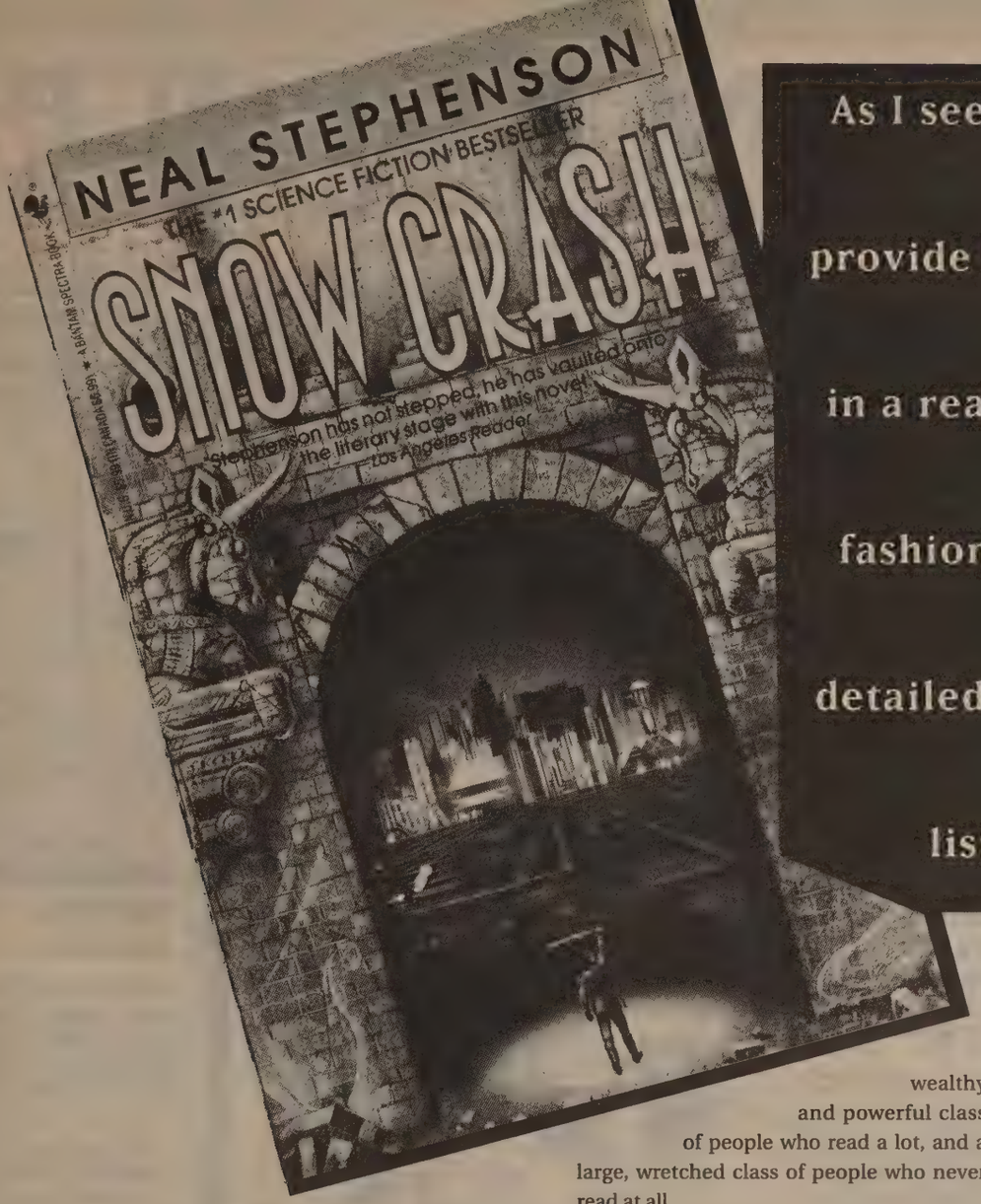
NEAL STEPHENSON
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SNOW CRASH
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As I see it, my role is to provide food for thought in a reasonably concise fashion, not to purvey detailed explanations or list examples.

Given the fact that hardware is coming right along, do you envision *Snow Crash*-like multimedia titles (interactive or otherwise) any time soon, and if so, would you prefer that to working in text?

This is the Content Question, which has been getting some attention (though perhaps not quite enough) in the current interactive media hoopla. I have numerous ideas for such projects and am investigating how to make them commercially practicable. I think we're going to see a lot more bad titles before we begin seeing good ones. The gap between the northern California high-tech mindset and the southern California entertainment-biz mindset is a lot wider than many people appreciate.

The more I work on interactive, the more appreciation I have for plain old text; I'm beginning to develop an almost numinous awe for the power of the written word. Text is the ultimate medium, especially for reaching the most highly intelligent segment of the population. One of the ideas nested in *Snow Crash* is that in the future we will have two social classes: a small, very wealthy and powerful class of people who read a lot, and a large, wretched class of people who never read at all.

Why text?

Video is highly literal, or at least it tends to be used that way. Text is inherently metaphorical and it forces you to use your brain in a more complicated fashion. Text can be created by one person with a pen while video requires tens of thousands of dollars in equipment and cooperation among numerous highly trained people. That's one thing we learned on the *Snow Crash* project, by the way—we were suckered by the idea that a home camcorder and garage production techniques could give us acceptable quality, and we learned the hard way that it wasn't so. It takes some time to learn how to use text properly—I'm still learning every day—but once you've got the hang of it you can create extremely complex webs of metaphors and allusions that deliver vast cognitive bandwidth over minimal informational bandwidth.

Think of it as a very efficient compression algorithm—reminiscent of fractal image compression in some ways—that requires a lot of power and a large database to decompress. Not all readers have developed the skill or accumulated the database, so it looks like gibberish to them. I can remember reading Dickens when I was in high school and having a terrible time with him. I thought he was dull and incomprehensible. Now that I'm in my 30s, I'm reading Dickens again and I'm getting it—I think he is hilarious, and uncannily precise in his use of language. My brain has learned to decompress Dickens's prose into mental constructs whose extreme complexity could never be guessed from the paltry trickle of bytes that makes up one of his sentences.

As for the haves/have-nots debate, compare the caliber of information available in, say, *The Economist* and the *Wall Street Journal* to what you can get by watching the news. There is something about the process of translating events into words that clarifies what is really going on and filters out the glamorous irrelevancies. Text has the power of generalization and abstraction while video is relentlessly concrete.

I honestly don't think all the digital media in the world are going to make print go away. But at the same time, it also seems to me that extremely well educated people in their 20s are *very* literate in terms of movies, videos, etc. and not text-literate at all. I think we're arguably *already* in the post-text age to some extent.

Depends on who you are and what you do. This is certainly true for the mass of people. But if you hop a commuter train

Continued on page 152

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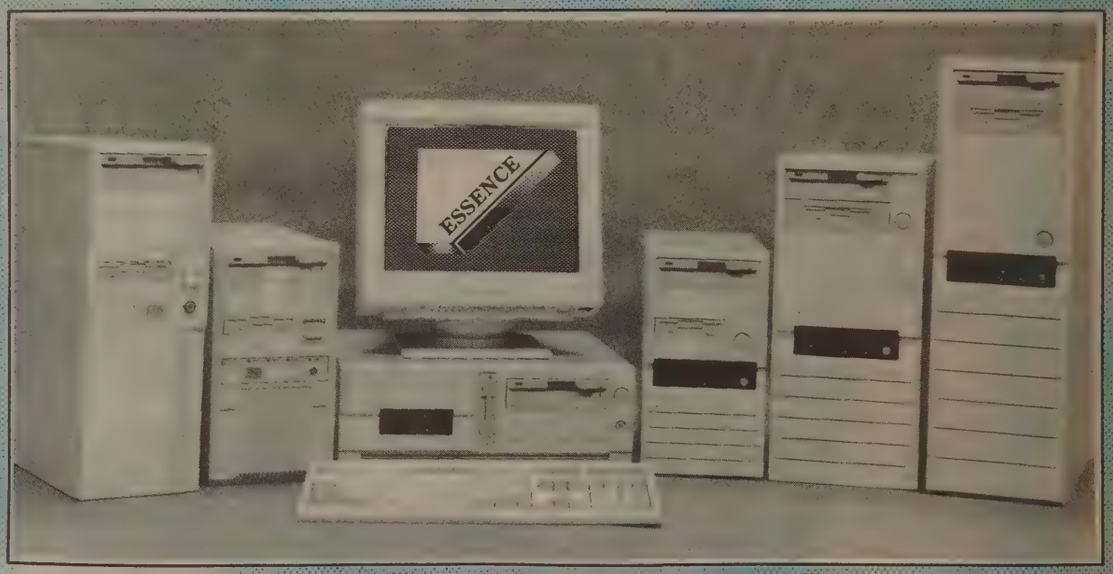

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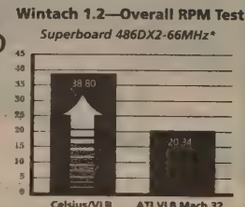

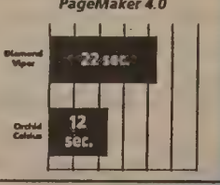

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* 8 EISA Slots, 3VLB Slots
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486DX2-50VLB... $1250
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* 4MB Memory on board exp. up to 64MB
* TEAC 1.2M & 1.44M FDD
* 32-Bit Orchid Fahrenheit VLB Accelerator w/1MB
* 32-Bit VLB IDE HDD Controller
* 2 Ser / 1 Par / 1 Game
* Mid-Veritcal Case
* 230 Watt Power Supply
* Enhanced 101 Keys Kbrd.

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486DX2-50V..... $1055
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486SX-33V..... $840
486SX-25V..... $725
486DLC-40V..... $790
486DLC-33V..... $760
386DX-40V..... $670

* Vega 386/486DX ISA M/B
* 256K Cache ***DX2-66/DX50***
* 64K Cache for all others
* 4MB Memory exp. to 32MB
* TEAC 1.2M & 1.44M FDD
* 2 Ser / 1 Par / 1 Game
* Mid-Veritcal Case
* 230 Watt Power Supply
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486DX-50 ..... $1420
486DX-33 ..... $1240

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* Intel 486DX/DX2/SX CPU
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* 4MB Memory on board exp. up to 32MB
* TEAC 1.2M & 1.44M FDD
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* 2 Ser / 1 Par / 1 Game
* Mid-Veritcal Case
* 230 Watt Power Supply
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486DX2-50LB.. $1100
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486DX-33LB $990

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* 4MB Memory on board exp. up to 32MB
* TEAC 1.2M & 1.44M FDD
* 32-Bit VESA Local Bus SVGA Graphics Card w/1MB
* 32-Bit VLB IDE HDD Crntrlr.
* 2 Ser / 1 Par / 1 Game
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* 200 Watt Power Supply
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486DX-50 ..... $1020
486DX2-50 ..... $955
486DX-40 ..... $875
486DX-33 ..... $840
486SX-33 ..... $735
486SX-25 ..... $635

* 486DX/SX ISA M/B
* 256K Cache ***DX2-66/DX50***
* 128K Cache for all others
* 4MB Memory exp. to 32MB
* TEAC 1.2M & 1.44M FDD
* IDE FDD/HDD Controller
* 2 Ser / 1 Par / 1 Game
* Mini-Veritcal Case
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486DLC-33 ..... $665
386DX-40 ..... $570
386DX-33 ..... $590
386SX-40 ..... $400
386SX-33 ..... $390

* 486DLC M/B w/ Cyrix 486DLC Microproccessor & Math-Co or 386DX/SX M/B
* 128K Cache (none on 386SX)
* 4MB Memory exp. to 32MB (2MB memory for 386SX)
* TEAC 1.2M & 1.44M FDD
* IDE FDD/HDD Controller
* 2 Ser / 1 Par / 1 Game
* Mini-Veritcal Case
* 200 Watt Power Supply
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MicroSoft DOS 6.0 ..... $40
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Int. 14400 Baud Fax/ Modem $160
Mitsumi CRMC Internal CD-ROM ... $195
Sound Blaster Pro $136
Media-Vision Pro Audio Spectrum 16 Sound Card $178
Orchid Sound Producer Pro w/Speaker & Mic $99
Power Center (UL) $16
Mitac Multimedia Starter Kit $390
- MitsumiCRMC CD-ROM (350ms)
- Sound Blaster Pro compat sound card
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ViewSonic 17 17" Dig. Multi-Freq Mntr ... $1048
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CTX-5468NI 14" NI SVGA Monitor $282
CTX-1461LR 14" NI SVGA Monitor $315
CTX-1560LR 15" Digital NI Monitor $430
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MAG 17F/H 17" Digital NI Monitor $940
Mitac 1564 15" Digital FST NI Monitor $395
Mitac STA-728 17" NI SVGA Monitor $680
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NEC 4FGe Multi-Frequecny Monitor $740
NEC 5FGe Multi-Frequency Monitor $1125
Optiquest 1000S 14" NI Monitor $281
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Optiquest 2000DX 15" Digital NI Monitor . $397
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Archive 9250i 250MB Tape Backup $175
Colorado DJ-10 120MB Tape Backup $156
Colorado DJ-20 250MB Tape Backup $184
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Panasonic KX-P2123 (24Pin/240cps/80col) **$229**
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Panasonic KX-P2124 (24Pin/320cps/80col) **$305**
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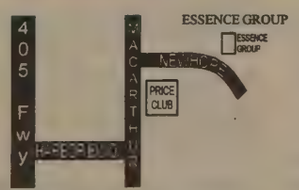

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OPTI Mini 486DLC-40MHz M/B w/128K Cache (w/MathCo) $267.00
OPTI Mini 486DLC-33MHz M/B w/128K Cache (w/MathCo) $253.00
OPTI Mini 386DX-40MHz M/B w/128K Cache (Write-back cache) $160.00
UMC Mini 386DX-40MHz M/B w/128K Cache (Write-back cache) $161.00
OPTI Mini 386DX-33MHz M/B w/128K Cache (AMD CPU) $177.00
UMC Mini 386DX-33MHz M/B w/128K Cache (AMD CPU) $178.00
**** 256K Cache upgrade from 64K for all 486 and 386 M/B $35.00*
**** 256K Cache upgrade from 128K for all 486 and 386 M/B $25.00*
PC Mini 386SX-40MHz M/B $101.00
OPTI Mini 386SX-33MHz M/B $130.00
PC Mini 386SX-33MHz M/B $93.00

ESSENCE GROUP

17815 Newhope Street, Suite G, Fountain Valley, CA 92708

Order Hot Line: 1-714-546-3110 ✧ Technical Support: 1-714-546-7902 ✧ Fax Order Line: 1-714-546-3803

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ADD-ON BOARDS

Mono Graphics Printer Card	$14.00
AVGA-1 VGA Card w/256K	$27.00
AVGA-3 (Cirrus Logic GD5420) 1MB Graphics Accelerator (32K color)	$55.00
AVGA-3 (Cirrus Logic GD5422) 1MB Graphics Accelerator (32K color)	$63.00
TVGA-9000 VGA Card w/256K (Trident 9000 Chipset, upto 512K)	$32.00
TVGA-8900CL 1MB SuperVGA Card (2x faster than Trident 8900C)	$58.00
PVGA-1C VGA Card w/256K (WD90C11 Chipset, upto 512K)	$46.00
PVGA-1DW Graphics Accelerator w/1MB & Hi-Color Chip	$90.00
ATi Graphics Ultra w/1MB VRAM & Mouse	$211.00
ATi Graphics Ultra Plus (1280x1024, 2MB Dram)	$249.00
ATi Graphics Ultra Pro (1280x1024 Non-Interlaced, 2MB VRam)	$349.00
ATi Graphics Ultra Pro EISA w/2MB VRAM	$518.00
Diamond SpeedStar Pro Graphics Accelerator w/1MB	$127.00
Diamond Stealth-24 1MB Windows Accelerator (16Million colors)	$168.00
Diamond Stealth Pro Graphics Accelerator w/1MB VRAM	$255.00
Orchid Pro-Designer IIs 1MB VGA Card w/Sierra RAMDAC	$135.00
Orchid Pro-Designer IIs-E 1MB EISA VGA Card w/Sierra RAMDAC	$163.00
Orchid Fahrenheit Windows Accelerator (24-bit, 16.7Mil colors) 1MB	$165.00
Orchid Fahrenheit-VA Windows Accelerator with Voice Annotation w/1MB -24bit, 16.7Million colors, 1280x1024, Audio capabilities	$180.00
High Speed AT I/O (2 Serial 1 Parallel) - compatiable 16C550	$39.00
Parallel (Printer) Card	$10.00
AT IDE Adapter (Dual floppy & hard disk) w/Cable	$15.00
AT Super IDE IO Adapter (Dual floppy & hard disk, 2S, 1P, 1G)	$17.00
GSI-11V 2.88M Four (4) Floppy Controller & Cable	$55.00
GSI-18V Co-resident IDE Controller (Works with ST412, ESDI, SCSI)	$42.00
GSI-21V 2.88M Four (4) Floppy & Intelligent IDE Adapter w/Cable	$62.00
Promise IDE Caching Controller (512K, upto 8.5MB, 2FDV2HD)	$120.00
Promise VESA Local Bus IDE Caching Controller-DC-4030VL	$191.00
Tekram DC-600B ISA IDE Caching Controller (up to 16MB)	$110.00
Tekram DC-680 VESA Local Bus IDE Caching Cntrir (upto 16MB)	$168.00
DTC-2290 EISA IDE Floppy/Hard Disk Contorller	$121.00
DTC-3290 EISA SCSI Caching FD/HD Controller (0K, upto 4MB)	$435.00
DTC-3292 EISA SCSI FD/HD Controller	$325.00
UltraStor 14F SCSI FD/HD Controller	$210.00
UltraStor 24F EISA SCSI FD/HD Controller	$370.00
UltraStor 34F VESA Local Bus SCSI FD/HD Controller	$285.00
Future Domain 167016-bit SCSI Floppy/Hard Disk Adapter Kit	$157.00
Always IN-2000 16-bit SCSI Host Adapter (Novell Certified)	$189.00
ADAPTEC AHA-1522K SCSI Adapter Kit	$157.00
ADAPTEC AHA-1542BK SCSI Bus Master Host Adapter Kit	$240.00
ADAPTEC AHA-1542C SCSI Bus Master Host Adapter (Card only)	$210.00
ADAPTEC AHA-1542CK SCSI Bus Master Host Adapter Kit	$260.00
ADAPTEC AHA-1542CK-Plus SCSI Bus Master Host Adapter Kit	$320.00
ADAPTEC AHA-1740 EISA SCSI Bus Master Adapter Kit	$340.00
ADAPTEC AHA-1742AK EISA SCSI Bus Master Adapter Kit	$350.00
ADAPTEC AHA-1742AK EISA SCSI Bus Master Adapter Kit	$415.00

MONITORS

AMDEK 432N 114" Mono VGA Monitor (Amber or Paper-white)	$125.00
Tatung MM-14SAE 14" Mono VGA Monitor (1024x768)	$129.00
CTX 5439A 14" SuperVGA Color Monitor (1024x768, .39dp)	$228.00
CTX 5468A 14" SuperVGA (TriScan) Color Monitor (1024x768, .28dp)	$260.00
CTX 5468NI 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$282.00
CTX 1461LR 14" Non-Interlaced Monitor (1024x768, 72Hz refresh)	$315.00
CTX 15601 5" Digital Non-Interlaced Color Monitor (1024x768, .28dp)	$430.00
CTX 1561 15" Non-Interlaced Color Monitor (1024x768, .28dp)	$408.00
CTX 17601 7" Digital Flat-Screen Color Monitor (1280x1024, .28dp)	$775.00
Digi View HR-1401 14" SuperVGA Color Monitor (1024x768, .39dp)	$212.00
Digi View HR-1428 14" SuperVGA Color Monitor (1024x768, .28dp)	$250.00
Digi View HR-1430ni 14" Non-Interlaced Monitor (1024x768, .28dp)	$272.00
Infiniti IN8339SV 14" SuperVGA Color Monitor (1024x768, .39dp)	$225.00
Infiniti IN8828SV 14" SuperVGA Color Monitor (1024x768, .28dp)	$258.00
Infiniti IN8828N4 14" Non-Interlaced Color Monitor (1280x1024, .28dp)	$298.00
Hitachi CM1584 15" Non-Interlaced Monitor (.28dp)	$454.00
MAG 1564 15" Color Monitor (1280x1024, .28dp)	$435.00
MAG MX-15H 15" Color Monitor (1280x1024, .28dp)	$525.00
MAG MX-17H 17" Color Monitor (1280x1024, .28dp)	$940.00
Mitac Magic View 1564 15" Multi-Freq Monitor (1280x1024, .28dp)	$395.00
Mitac STA-7281 7" Multi-Frequency Monitor (1280x1024, .28dp0	$680.00
NEC 3FGe 15" Multi-Frequency Color Monitor (1024x768, .28dp)	$625.00
NEC 4FGe 15" Multi-Frequency Color Monitor (1024x768, .28dp)	$740.00
NEC 5FGe 17" Multi-Frequency Color Monitor (1024x768, .28dp)	$1125.00
NEC MultiSync 5FG21" Color Monitor (1280x1024, .28dp)	$1320.00
NEC MultiSync 6FG21" Color Monitor (1280x1024, .28dp)	$2350.00
Optiquest 800S 14" VGA Color Monitor (640x480, .39dp)	$221.00
Optiquest 900S 14" SuperVGA Color Monitor (1024x768, .28dp)	$259.00
Optiquest 1000S 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$281.00
Optiquest 1500D 14" Digital Non-Interlaced Monitor (1024x768, .28dp)	$370.00
Optiquest 2000DX 15" Digital Multi-Freq Monitor (1280x1024, .28dp)	$397.00
Optiquest 4000D 17" Dig. Multi-Freq Color Monitor (1280x1024, .28dp)	$805.00
Sony CPD-1320 14" Non-Interlaced Monitor (640x480, .25dp)	$357.00
Sony CPD-1430 14" MultiScan Monitor (Non-Interlaced, .25dp)	$597.00
Sony CPD-1730 17" MultiScan Monitor (Non-Interlaced, .25dp)	$1043.00
Sony CPD-2036S 20" MultiScan Monitor (non-Interlaced, .30dp)	$1995.00
ViewSonic 4E 14" SuperVGA Color Monitor (1024x768, .28dp)	$276.00
ViewSonic 6 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$300.00
ViewSonic 6E 14" Non-Interlaced Color Monitor (1024x768, .28dp)	$300.00
Viewsonic 5E 14" NI Color Monitor (1024x768, 72Hz refresh)	$380.00
ViewSonic 6FS 15" Digital Multi-Frequency Color Monitor	$478.00
ViewSonic 7 17" Digital Multi-Frequency Color Monitor (.28dp)	$883.00
ViewSonic 15 15" Digi Multi-Freq SVGA (.28dp, 76Hz refresh)	$500.00
ViewSonic 17 17" Digital Multi-Freq Monitor (.28dp, 1600x1280)	$1048.00
ViewSonic 20 20" Digital Multi-Freq Monitor (.28dp, 1600x1280)	$1668.00
ViewSonic 21 21" Digital Multi-Freq Monitor (.28dp, 1600x1280)	$1893.00

**** Please call for Hitachi, Mitsubishi, Radius, Seiko & SuperMac Monitors prices*

FLOPPY & HARD DRIVES

TEAC 1.2MB FDD (5.25")	$54.00
TEAC 1.44MB FDD (3.5") w/Mounting Kit	$46.00
TEAC 2-in-1 1.2/1.44MB FDD	$122.00
TEAC 2.88MB FDD (3.5") w/Mounting Kit	$87.00
Mitsumi 1.2MB FDD (5.25")	$52.00
Mitsumi 1.44MB FDD (3.5") w/Mounting Kit	$44.00
Toshiba 2.88MB FDD (3.5") w/Mounting Kit	$73.00
IOmega Floptical Drive w/SCSI Interface (21MB)	$440.00
IOmega Floptical Disk (21MB)	$27.00
Sysgen ValueStor Floptical Drive w/Kit	$332.00
Sysgen ValueStor Floptical Disk - Dual pak	$52.00
Conner CP-300040MB IDE HDD (28ms)	$140.00
Conner CP-30084E 85MB IDE HDD (17ms)	$172.00
Conner CP-30104 120MB IDE HDD (17ms)	$193.00
Conner CP-30174 170MB IDE HDD (17ms)	$208.00
Conner CP-30204 212MB IDE HDD (12ms, 256K cache buffer)	$255.00
Conner CP-30254 250MB IDE HDD (14ms, 64K cache buffer)	$258.00
Conner CP-30344 340MB IDE HDD (12ms, 256K cache buffer)	$330.00
Conner CP-30544 520MB IDE HDD (12ms, 256K cache buffer)	$615.00
Conner CP-30080E 85MB SCSI HDD (17ms)	$198.00
Conner CP-30200 212MB SCSI-2 HDD	$327.00
Conner CP-30540 545MB Fast SCSI-2 HDD (12ms, 256K cache buffer)	$625.00
Fujitsu M2624T 520MB IDE HDD (12ms, 5yrwarranty)	$615.00
Fujitsu M2624FA 520MB SCSI HDD (12ms, 5yr warranty)	$620.00
Fujitsu M2694SA 1.2GB SCSI HDD (10.5ms, 3.5", 5yrwarranty)	$1080.00
Fujitsu M2652S 2.0GB SCSI HDD (12ms, 5yrwarranty)	$1855.00
Fujitsu M2654S 2.4GB SCSI HDD (12ms, 5yrwarranty)	$1905.00
Maxtor MX-7131A 131MB IDE HDD (15ms)	$202.00
Maxtor MX-7120S 120MB SCSI HDD (15ms)	$217.00
Maxtor MX-7170A 170MB IDE HDD (15ms)	$235.00
Maxtor MX-7213A 213MB IDE HDD (15ms)	$240.00
Maxtor MX-7213S 213MB SCSI HDD (15ms)	$277.00
Maxtor MX-7245A 245MB IDE HDD (14ms)	$272.00
Maxtor MX-7245S 245MB SCSI HDD (14ms)	$310.00
Maxtor MX-7345A 345MB IDE HDD (14ms)	$338.00
Maxtor MX-7345S 345MB SCSI HDD (14ms)	$420.00
Maxtor MX-540SL 540MB SCSI HDD (8.5ms)	$880.00
Maxtor MXT-1240S 1.2GB SCSI HDD (8.5ms)	$1250.00
Maxtor PO-121.2GB SCSI HDD (13ms)	$935.00
Maxtor P1-17S 1.7GB SCSI HDD (13ms)	$1284.00
Quantum ProDrive ELS 85MB IDE HDD (17ms, 2yrwarranty)	$187.00
Quantum ProDrive ELS 127MB IDE HDD (17ms, 2yrwarranty)	$200.00
Quantum ProDrive ELS 170MB IDE HDD (17ms, 2yrwarranty)	$210.00
Quantum ProDrive LPS 240MB IDE HDD (15ms, 256K Cache)	$255.00
Quantum ProDrive 525AT 525MB IDE HDD (12ms, 512K Cache)	$610.00
Quantum ProDrive ELS 85MB SCSI HDD	$191.00
Quantum ProDrive ELS 127MB SCSI HDD	$216.00
Quantum ProDrive ELS 170MB SCSI HDD	$227.00
Quantum ProDrive LP 240MB SCSI HDD	$275.00
Quantum ProDrive 525S 525MB SCSI HDD	$620.00
Quantum ProDrive 700S 700MB SCSI HDD (5yrwarranty)	$833.00
Quantum ProDrive 1050S 1050MB SCSI-2 HDD (5yrwarranty)	$955.00
Quantum ProDrive 1225S 1225MB SCSI-2 HDD (5yrwarranty)	$1080.00
Toshiba MK-438FB 877MB SCSI-2 HDD (12.5ms)	$895.00
Toshiba MK-538FB 1.2GB SCSI-2 HDD (12.5ms)	$948.00
Western Digital AC2200209MB IDE HDD (13ms)	$232.00
Western Digital AC2250250MB IDE HDD (13ms)	$275.00
Western Digital AC2340340MB IDE HDD (13ms)	$330.00
Western Digital AC2420420MB IDE HDD (13ms0	$475.00

**** Please call for Micropolis, Seagate, & Toshiba Hard Disk Drives prices*

SyQuest SQ555 44MB SCSI Removable Disk Drive	$290.00
SyQuest SQ5110 88MB SCSI Removable Disk Drive	$335.00
SyQuest SQ3105 105MB IDE Removable Disk Drive (3.5")	$485.00
SyQuest SQ40044MB Cartridge	$75.00
SyQuest SQ80088MB Cartridge	$108.00
SyQuest SQ310105MB 3.5" Cartridge	$90.00
SyQuest SQ01 SCSI Adapter w/Software	$45.00
SyQuest External Kit	$95.00
Summit SE-120 120MB Tape Backup w/PC Tool Backup Software	$150.00
Summit SE-250 250MB Tape Backup w/PC Tool Backup Software	$180.00
Summit SE-305 305MB IDE Tape Backup w/Summit Safe Software	$260.00
Conner Tape-Stor 250MB Tape Backup w/One Pre-formatted Tape	$175.00
Hi-Lite (Archive) California-250 250MB Tape Backup	$185.00
Hi-Hite (Archive) California 525 525MB SCSI Tape Backup	$525.00
Colorado Memory System JT-10 120MB **Parallel Port** Tape Backup	$305.00
Colorado Memory System JT-20 250MB **Parallel Port** Tape Backup	$365.00
Colorado Memory System DJ-10 120MB Tape Backup	$156.00
Colorado Memory System DJ-20 250MB Tape Backup	$184.00
Colorado Memory System AB-11 External Adapter Kit	$35.00
Colorado Memory System KE-09 External Drive Kit	$75.00
Colorado Memory System FC-10 500Kb/s-1Mb/s Adapter Kit	$85.00
Colorado Memory System TC-15 Data Compression Adapter Kit	$185.00
3M DC2120 250MB Pre-formatted Mini Data Cartridge (Ximat format)	$20.00
3M DC2120 120/250MB Mini Data Cartridge	$19.00
Sony QD2120 120/250MB Mini Data Cartridge	$17.00
Maxell DC-2120 120/250MB Mini Data Cartridge	$17.00

CHASSIS (CASES)

CS-B01 Baby AT Case w/200W P.S. (3x5.25", 1x3.5")	$51.00
CS-20 Baby AT Case w/200W ULP.S. (3x5.25", 1x3.5")	$83.00
CS-35 Mid Vertical Case w/230W ULP.S. (3x5.25", 3x3.5", Digital)	$92.00
CS-36 Full Vertical Case w/230W ULP.S. (6x5.25", 2HD, Digital)	$122.00
CS-300GTS Full Vertical Case w/300W ULP.S. (7x5.25", Double fan)	$175.00
CS-510 Baby AT Case w/200W P.S. (3x5.25", 1x3.5")	$62.00
CS-609T Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5", Digital)	$56.00
CS-609M Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5")	$54.00
CS-740 Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5", Door, Digital)	$64.00
CS-760 Mid Vertical Case w/230W P.S. (3x5.25", 3x3.5", Door, Digital)	$86.00
CS-780 Full Vert. Case w/230W ULP.S. (4x5.25", 2HD, Door, Digital)	$117.00
CS-931A Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5", Digital)	$53.00
CS-931B Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5", Digital)	$55.00
CS-932A Mini Vertical Case w/200W P.S. (2x5.25", 3x3.5")	$51.00
CS-932B Mini Vertical Case w/230W P.S. (2x5.25", 3x3.5")	$53.00
CS-923 Mid Vertical Case w/230W P.S. (3x5.25", 3x3.5", Digital)	$72.00
CS-912 Full Vertical Case w/230W ULP.S. (4x5.25", 2HD, Digital)	$105.00
CS-9000 MPC Desktop Case w/200W ULP.S. & 30Watts Speakers	$140.00
Diamond Series: (Black color model available +$3.00)	
CS-130 Full Vertical Case w/250W ULP.S. (4x5.25", 2HD, Digital)	$126.00
CS-230 Mid Vertical Case w/250W ULP.S. (4x5.25", 2HD, Digital)	$110.00
CS-330 Mini Vertical Case w/220W ULP.S. (2x5.25", 3x3.5", Digital)	$81.00
CS-530 Desktop Case w/250W ULP.S. (2x5.25", 2x3.5", 2HD, Digital)	$86.00
CS-730 Baby AT Case w/220W ULP.S. (2x5.25", 1x3.5, 1HD, Digital)	$81.00
CS-830 Slim Line Case w/220W ULP.S. (1x5.25", 1x3.5", 1HD, Digital)	$81.00
2nd Fan for Diamond Series cases (CS-130, CS-230, CS-530)	*$10.00*

PRINTERS

Canon BJ-10ex Bubble Jet Printer	$248.00
Canon BJ-200 Bubble Jet Printer	$330.00
Canon BJ-230 Bubble Jet Printer (Wide)	$408.00
Canon BJ-300 Bubble Jet Printer	$333.00
Canon BJC-800 Color Bubble Jet Printer	$1533.00
Canon BJC-820 Color Bubble Jet Printer (Wide)	$1647.00
Citizen PN-48 Notebook Printer (Professional)	$245.00
Citizen GSX-190 Printer (9pin/color option)	$159.00
Citizen GSX-230 Quiet Printer (24pin/270cps/color option)	$235.00
Citizen GSX-240 Quiet Printer (24pin/300cps/80col/color option)	$290.00
Citizen GSX-145 Printer (24pin/192cps/132col/color option)	$355.00
**** Color Kit for Citizen 200GX, GSX-230 or GSX-240*	*+$3.00*
Epson Action Printer 2250 (9pin)	$120.00
Epson Action Printer 3250 (24pin)	$179.00
Epson FX-870 Printer (9pin)	$275.00
Epson FX-1170 Printer (9pin, Wide)	$368.00
Epson LQ-570+ Printer (24pin)	$249.00
Epson LQ-870 Printer (24pin)	$455.00
Epson LQ-1070 Printer (24pin, Wide)	$365.00
Epson LQ-1170 Printer (24pin, Wide)	$625.00
Epson LQ-2550 Printer (24pin. Wide)	$930.00
Epson Action Laser 1500 (1MB, 6ppm)	$680.00
Epson EPL-8000 Laser Printer	$885.00
NEC Silent Writer Model 95 w/2MB Postscript Printer (6ppm)	$1395.00
NEC Silent Writer Model 97 w/2MB Postscript Printer (10ppm)	$1745.00
Panasonic KX-P1150 Printer (9pin/240cps/80col)	$139.00
Panasonic KX-P1123 Printer (24pin/220cps/80col)	$176.00
Panasonic KX-P2023 Quiet Printer (24pin/240cps/80col)	$195.00
Panasonic KX-P2180 Quiet Printer (9pin/240cps/80col/color option)	$157.00
Panasonic KX-P2123 Quiet Printer (24pin/240cps/80col/color option)	$229.00
Panasonic KX-P2124 Quiet Printer (24pin/320cps/80col/color option)	$305.00
Panasonic KX-P2624 Quiet Printer (24pin/300cps/132col)	$360.00
**** Color Kit for Panasonic KX-P2180, KX-P2123 or KX-P2124*	*+$5.00*
Panasonic KX-P4410 Laser Printer (5ppm/512K/300dpi)	$549.00
Panasonic KX-P4430 Laser Printer w/SaintPaint (5ppm/1MB/300dpi)	$659.00
Panasonic KX-P4440 Laser Printer w/SaintPrint (10ppm/1MB/300dpi)	$1159.00
Panasonic KX-P4450i Laser Printer (11ppm/512K/300dpi)	$959.00
**** Please call for Panasonic Printer Accessories and Consumables Products*	
Okidata ML320	$307.00
Okidata ML321	$430.00
Okidata OL400P LED Page Printer	$557.00
Okidata OL810 LED Page Printer	$920.00
Okidata OL830 Plus LED Page Printer	$1105.00
Okidata OL850 LED Postscript Printer	$1227.00
Star NX-1001 Multi-Font Printer (9pin/180cps/80col)	$138.00
Star NX-2430 Multi-Font Printer (14pin/240cps/80col)	$227.00
Star NX-2420R Rainbow Color Priner (24pin/250cps/80col)	$286.00
Star LS-5 Laser Printer (5ppm/512K/600x300dpi/15 scalable typefaces)	$636.00
Star LS-5EX Laser Printer (5ppm/1MB/600x300dpi/23 scible typefaces)	$800.00
Star LS-5TT Laser Printer (5ppm/2MB/600x300dpi/58 scible typefaces)	$1057.00

KEYBOARDS

BTC 5339SX 101keys Keyboard	$25.00
Chiconv KB-5181 101keys Keyboard	$38.00
Chiconv KB-5311 101keys Keyboard	$25.00
Chiconv KB-5911 TrackBall Keyboard	$63.00
Focus-2001 101keys Keyboard w/Hard Dustcover (Click)	$40.00
Focus-2001B 101keys Keyboard w/Hard Dustcover (Click)-Black	$45.00
Focus-6000 101keys Keyboard (Soft click)	$41.00
Focus-8000 111keys Keyboard (Calculator, Soft click)	$45.00
Focus-9000 128keys Keyboard (Programmable, Click)	$62.00
Fujitsu-4700 101keys Keyboard	$47.00
Fujitsu-4870 101keys Keyboard	$37.00
Honeywell-101WN 101keys Keyboard (3yr. warranty)	$40.00
Keytronic EO-5000 101keys Keyboard	$35.00
KT-2000 101keys Keyboard (Keytronic made)	$36.00
MaxSwitch 101keys Keyboard	$36.00
MaxiSwitch 124keys Programmable Keyboard	$63.00

MISCELLANEOUS

Honeywell 3-button Serial Mouse	$42.00
Logitech Dexxa Mouse	$24.00
Logitech Bus Mouse Man	$70.00
Logitech PS-2/Serial Combo Mouse Man	$68.00
Logitech Trackman II (Serial)	$79.00
Logitech Trackman Portable	$100.00
Logitech Cordless Mouse	$88.00
Logitech ScanMan 256 w/OCR software	$255.00
MicroSoft Serial Mouse	$78.00
MicroSoft Bus Mouse	$88.00
MicroSoft Ball Point Mouse for Notebook computer (PS/2 Version)	$110.00
MicroSoft Ball Point Mouse for Notebook computer (Serial/PS-2 Version)	$115.00
Hayes Optima External 9600 Data Modem	$335.00
Hayes Optima External 9600 Data/Fax Modem	$348.00
Hayes Optima External 14400 Data Modem	$355.00
Hayes Optima External 14400 Data/Fax Modem	$378.00
Intel SatisFAXtion model 100 Internal Fax Modem	$105.00
Intel SatisFAXtion model 200 Internal Fax Modem	$305.00
Intel SatisFAXtion model-400 Internal Fax Modem	$395.00
Intel SatisFAXtion modem 400 External Fax Modem	$405.00
U.S. Robotics Sportster 9600 PC Internal Data Modem	$207.00
U.S. Robotics Sportster 9600 External Modem	$213.00
U.S. Robotics Sportster 14400 PC Internal Data Modem	$196.00
U.S. Robotics Sportster 14400 External Data Modem	$219.00
U.S. Robotics Sportster 14400/9600 Internal Data/Fax Modem	$219.00
U.S. Robotics Sportster 14400/9600 External Data/Fax Modem	$245.00
Zoltrix 2400i Internal 2400 Baud Data Modem	$30.00
Zoltrix Standard Internal 9600SR/2400 Send/Receive Fax/Data Modem	$53.00
Zoltrix Standard Internal 9600SR/2400 Send/Receive Fax/Data Modem -w/BitFax for Windows	$54.00
Zoltrix Enhanced Internal 9600SR/2400 Send/Receive Fax/Data Modem - with Hardware MNP5 & V.42bis	$90.00
Zoltrix Pocket 9600SR/2400 Send/Receive Fax/Data Modem	$99.00
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into New York City on any weekday, you'll see one coach after another filled with very affluent people in business suits who are all reading one thing or another. If you saw those same people carrying Newtons or watching video programs on Watchmans, you'd be amazed by how this new medium had penetrated the highest echelons of our society.

Any ideas what to *do* about the have/have-not problem in this regard?

I think it's fundamentally a cultural thing and that there is not much we can do to change cultures.

Based on the current and predictable state of the art, how do you think all this multimedia technology is going to evolve?

This might be kind of surprising given the contents of *Snow Crash*, but I don't really see a large mass market for fully immersive VR. Most people have to keep an eye on the kid or an ear on the doorbell and can't afford to immerse themselves in anything. It's more likely we'll see VR-through-a-window on our TV sets.

Given that people can't even program VCRs it's unlikely that they will be constructing their own virtual environments in significant numbers. This activity should attract a small cult of hobbyists, like model railroaders. It's true that the portions of the Metaverse shown in *Snow Crash* are intended more for interaction with other users, or telepresence, and less for consumption as entertainment. Partly this is a question of emphasis. The Metaverse has amusement parks but Hiro doesn't go to them. But experience suggests that people love to use computers as a way to connect with each other and so there should be a large market for such applications in any kind of networked VR scheme.

How do you see the relationship of the virtual and physical worlds evolving? Will most people spend much, or even most, of their time "escaping reality"? Will it be a classist kind of deal with a substantial underclass that's stuck in physicality?

As I said, I don't think that many people will do the immersive thing. It'll be big with the same people who play lots of video games today: teenagers and a few adult aficionados. The popularity of VR-in-a-window applications will simply depend on how how large an audience they appeal to. If there's any element of class stratification, it'll have more to do with which applications a user chooses, not whether they choose them. I'm hoping there will be ways to make applications that will be good for your mind, but I suspect most of them will be, as William Gibson put it better than I can, "like mainlining American television."

To what extent is the goggled-in person doing the same thing a lot of us did as kids, which was to spend days immersed in books until our moms told us to go outside and get into Reality?

Again, depends on the application. Reading text exercises your brain even if it's crappy text. I hope that some forms of interactive media will make people smarter and that people who spend days immersed in them will be the better for it.

***Snow Crash* raises a lot of social issues, one of them being the impact of technology on people's privacy. Do you think privacy is a lost cause? What, if anything, do you think of the cypherpunks?**

I'm inclined to think that encryption schemes are always going to stay a step or

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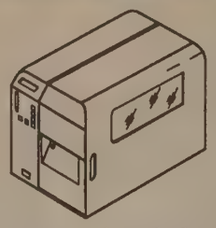

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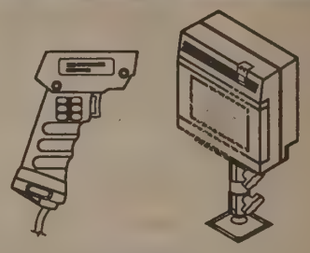

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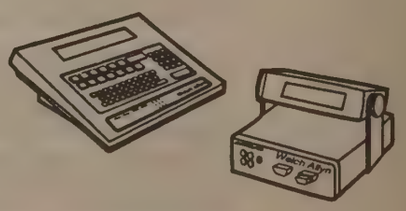

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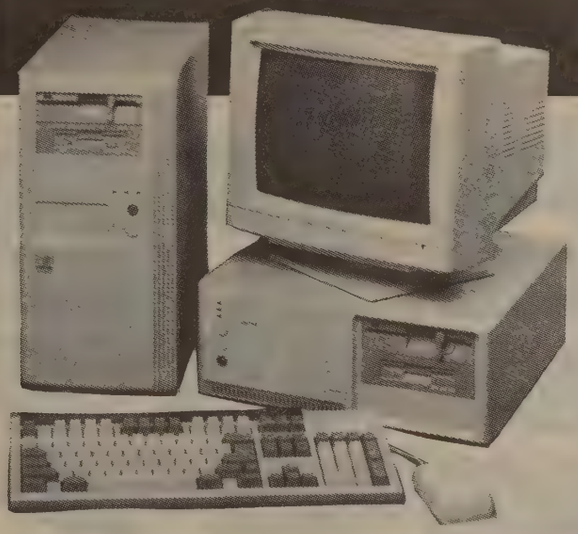

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two ahead of efforts to crack them.

Even if this is not the case, the fact that it takes a lot of effort systematically to violate people's privacy. Prominent individuals will always have hassles, but most of them can afford countermeasures.

If you're a member of the general public you don't have that much to worry about. If you see the magnitude of the operations put together by the likes of the CIA just to keep track of a small number of suspected foreign agents you can get a sense of how hard it is systematically to track large numbers of people. There's no profit in it unless you're running a police state and you can print your own money. This is the principle that the cypherpunks are taking advantage of with PGP, which is crackable but simply adds to the hassle factor and makes it even less profitable.

I'm a lot more concerned about people's privacy within the context of large institutions.

What scares you about current technology; what encourages you?

I'm more worried about the old technology falling into the hands of complete dickheads. Hopefully we can use our edge in new technology to protect ourselves after this happens.

Could you elaborate a bit on these things?

Reasonably imaginative readers should be able to puzzle out what I mean here. As I see it, my role is to provide food for thought in a reasonably concise fashion, not to purvey detailed explanations or list examples.

Was there particular real-life stuff that caused you to concoct some of the nightmare scenarios in *Snow Crash?*

Not in particular. Examples abound.

Something completely different—as a programmer, what kinds of projects do you like working on?

Since I do it on my own, I only work on things I really enjoy. The *Snow Crash* work was primarily image processing, which is not especially interesting in and of itself. Most of it was user interface code, which is typical in a GUI application. As a result, I've gotten to the point where I'm sick of doing user interface work and would prefer to work on the underlying meat of an application. Lisp, especially the Mac implementation, is good for that.

I've spent a lot of time playing around with fractals, simulations, genetic algorithms, and other stuff that interested me at one point or another. Rendering is a lot of fun. In particular I've had a lot of fun playing around with the RenderMan shading language. Unfortunately, on my current equipment it takes so long for a job to render that I have limited patience with such projects.

As sort of a meta-question, what's your personal opinion as to why there is this huge overlap between the science fiction and computer communities?

SF typically revolves around the creation of a whole alternate world. The particular storyline described in an SF story or novel is just one thread in an interlaced fabric of stories that, taken together, describe the world and its people as a whole. That's why SF lends itself so well to sequels, or even whole series of books: once the imaginary world is created it can support numerous characters and plots.

Why this appeals to computer people is an interesting question. It's not the technology angle, because the same argument applies to fantasy fiction which has no technological content at all. A coder's job is to become intimately familiar with the geography of an operating system, which is a kind of synthetic world, and to exploit its internal rules and quirks in order to accomplish some goal, and I think that there is some congruence between this and the above-mentioned characteristics of SF. ■

USER GROUPS cont.

Continued from page 122

Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1220 E. Market St., Long Beach. Novice and experienced welcome. $25/yr, $35 for a family. Call: Jim Wells, (310)439-7114. [Exp. #117.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School. Live presentations and giveaways. Meetings are free. Call: (310)471-2726. [Exp. #116.]

Microlink PCUG. Meetings: 1st Sat., 6:00 pm, La Habra Sr. Center, 165 E. La Habra Blvd., La Habra. Beginners and experts welcome. Free SIG classes. N. Orange Co./San Grabiel Valley. Call: (818)961-6214. [Exp. #115.]

Orange County IBM PC Users Group. Meetings: 2nd Tuesday, 6:30 pm. Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580 [Exp. #115.]

San Bernardino Personal Computer User Group. Meetings: Last Wed., 7:00 pm, CSU, San Bernardino, Pfau Library Bldg., Rm. PL-8. Call: Arthur Saltzman, (909)880-5755. [Exp. #118.]

Southwest PC User Group. Meetings: 3rd Sat., call for location, or write: PO Box 78785, Los Angeles, CA 90016. Call: Christine Tripp, (213)935-4105. [Exp. #117.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 4th Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)495-8325. [Exp. #118.]

TUG-NET. Meetings: 1st three Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #117.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Burbank Board of Realtors Bldg., 2006 W. Magnolia, Burbank. BBS, PD library, SIGs, newsletter. All welcome. Call: Wes Arnold, (213)221-4433; or Grayce Hruda, (818)842-3707. [Exp. #117.]

KAYPRO

KAYOS Kaypro User Group. Meetings: 4th Mon. of even months, 6:00 pm, El Segundo Library. Call: (310)379-8339. [Exp. #115.]

MACINTOSH

Los Angeles Macintosh Group (LAMG). Meetings: 3rd Thurs., 7:30 pm, Dept. of Water & Power, 111 N. Hope St. So. Cal's largest all-Mac user group meetings, monthly magazine, classes, PD software, and more. Call: (310)278-LAMG. [Exp. #114.]

Orange Apple Computer Club, Macintosh User Group. Meetings: 1st Sat., 1:00 Pm, Chemistry Lab, Orange Coast College. Presentations and club disks. Call: (714)770-1865 [Exp. #115.]

Original Apple Corps, Macintosh User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #114.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 7:30 pm, Pacific Elementary School, 1214 Pacific Ave., Manhattan Beach. Call: (310)644-3315. [Exp. #115.]

MULTIMEDIA

Multimedia Audio Technology Group. Multiple platform, multimedia audio presentations. Call: Chris Palmer, (818)364-2577. [Exp. #116.]

The International Interactive Communications Society, LA Chapter. Meetings: 7:30 pm, Electronic Cafe, 1649 18th St., Santa Monica. Free for members, $10 for nonmembers. Call: (310)535-1293. [Exp. #116.]

NEXTSTEP

Southern California NeXTSTEP User Group. Meetings: throughout LA County. Call: Mike Mahoney, (310)985-1550. Email: mahoney@csulb.edu. [Exp. #116.]

PROGRAMMING LANGUAGES

Business BASIC Users Of Southern California (BBUSC). Meetings: 6:00 pm, Cerritos Sheraton, Cypress Rm., 12725 Center Court Dr., Lakewood. An executive forum for business solutions using Business Basic software. Call: Christian Brantley, (714)379-5454. [Exp. #115.]

San Fernando Valley C++ User Group. Meetings: 7:00 pm, HP Bldg., Van Nuys. Speakers, discussions, demon., etc. on C++ and OO technology. Call: (818)332-8879. [Exp. #116.]

The Software Toolsmiths. Meetings: Last Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo. Discussions and tutorials on programming. Neophytes welcome. Call: John LuValle, (818)797-1820, or Howard Rogers, (310)532-3342. [Exp. #118.]

SGML

SGML (Standard Generated Markup Language) User Group, Southern California Chapter. Discussions, presentations, tutorials, networking, and educational forums applying to SGML. Call: Roger Watson, (310)337-0309. [Exp. #116.]

VIRTUAL REALITY

Virtual Reality Special Interest Group (VRSIG). Meetings: The Electronic Cafe, 1649 18th St., Santa Monica. Call: Dave Blackburn, (310)545-0369. [Exp. #114.]

ASSOCIATIONS

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, $25, or at the door, $35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #116.]

Orange County Association Of PICK Professionals. Meetings: 3rd Wed., 6:00 pm. Dinner: Members, $25; nonmembers, $30. Without reservations add $5. Call: (714)557-9229. [Exp. #114.]

Orange County Independent Computer Consultants Association. Call: (714)552-2384. [Exp. #116.]

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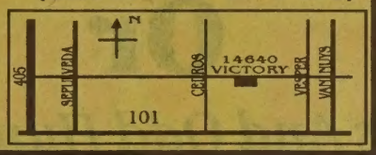

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NET-lore Or

Weird Documents And Odd Humor On The Internet

BY JOHN C. DVORAK

Anyone who has been lucky enough to take a college class in folklore will appreciate the fact that folklore has adapted to the Internet. Collectors of odd humor—the kind, so pervasive in the modern office, that's constantly Xeroxed and passed around—will be relieved to know that the electronic form of folklore has finally arrived.

NET-lore is here. Currently it takes the form of fake documents, the most famous of which is the Microsoft "Food for Windows" history, which I've personally received five times. To give you an idea of what NET-lore is like, here's the "Food for Windows" posting. This version goes back to April of 1993; it may have changes from an unknown original, just like those office cartoons that keep getting redrawn. Subsequent versions, of this posting all have minor changes.

This version is right off the Internet. Nobody has been able to find the author of this document (most folklore is anonymous). But we're still looking.

Monday, 10 AM — Chicago, Illinois, Cuisine International announced CUISINENET, the first internetworking program to seamlessly integrate word and food processing, called a breakthrough for small restaurants and snack bars. Cuisine Chairman Mark Meigs confidently predicted sales of thousands of copies with shipments soon to begin.

Monday, 4 PM — New York—Cuisine International shares closed sharply higher on announcement of new CUISINENET product.

Tuesday, 9 AM — Redmond, Washington—Microsoft Chairman William H. Gates, III announced that Microsoft Food for Windows would soon enter beta testing. Gates described the product as the first of a projected family of products to include Food for Windows, designed for small commercial dining establishments; Personal Food for Windows, designed for home kitchens; Portable Food for Windows, designed for lunchboxes; and, of course, at the high end, Food for Windows NC (Nouvelle Cuisine), designed for large institutional dining rooms. Asked by a reporter about CUISINENET, Gates said that he had never heard of the product, but was not surprised by it, because the software business is highly competitive, and Microsoft has to compete on the merits with many strong competitors, as the FTC had recently concluded.

Tuesday, 3 PM — Chicago, Illinois—An angry Mark Meigs showed reporters a copy of the nondisclosure agreement signed by Bill Gates, under which Cuisine International had informed Microsoft a year earlier about plans for CUISINENET. Meigs said that in hindsight, he should never have signed the agreement, as the only thing he learned from Microsoft was that Gates was considering making changes to Windows.

Wednesday, 9 AM — Redmond, Washington—Microsoft Chairman Bill Gates announced that Microsoft would soon publish specifications for the Windows Open Kitchen Architecture (WOKA), a series of design specifications to permit manufacturers of toasters, ranges, and other kitchen appliances to integrate their products into the forthcoming Microsoft Food for Windows line. Asked about reports of a nondisclosure agreement with Cuisine International for a similar product, Gates said that the other product was really at most a niche product, and would probably have less functionality than the food-related features that Microsoft would be building into the new Unsaturated FAT File System which would be part of DOS 7.0. Gates said that he doubted there would be much interest in a dead-end solution that would not be able to keep up to date with advances in WOKA. Gates added that over 11,000 manufacturers of kitchen appliances were already having serious discussions with Microsoft about WOKA, and that he expected almost all important eaters of food to standardize on the WOKA environment.

Wednesday, 10 AM — Redmond, Washington—Microsoft Chairman Bill Gates announced that he would be giving the keynote speech at the American Bakers annual convention on "Nutrition at Your Fingertips." Gates played down speculation that he would use the Bakers convention to introduce Microsoft Food for Windows, saying only that alpha testing was proceeding ahead of schedule, and the product would be shipped when it was ready.

Wednesday, 11 AM — Redmond, Washington—Microsoft Corporation announced that its chairman, William H. Gates, III, had made a donation of over $250 of personal funds to the Cordon Bleu to begin an endowment fund for the Bill Gates Professorship of Advanced Cookery. The famous French cooking school confirmed that it had agreed to be a beta site for the much discussed Food for Windows application sweet.

Thursday, 9 AM — New York—*PCWeek Magazine* reported in a copyrighted story that it had obtained a copy of correspondence from Microsoft to Cuisine International, demanding that the small developer of kitchen software cease using the Cuisine name, as it infringes on the trademark for Microsoft Food for Windows NC. Microsoft added that Chairman Mark Meigs would also have to change his own name as Mark infringed a copyright on the Windows Edit menu, Meigs infringed the trademark on Meigs Field in Microsoft Flight Simulator, and Chairman infringed the trademark on Bill Gates' title which he had acquired with personal funds from Mao's estate. Also, Microsoft advised that while the company did not actually have to move out of Chicago, use of the name on press releases infringed a trademark on Windows 4.0

Thursday, 4 PM — New York—Cuisine International stock closed at 0-bid, 1/16-asked.

Friday, 9 AM — ? —An anonymous spokesman for an unnamed Midwestern software developer announced the discontinuation of operations. Undescribed legal problems were cited as the reason. Others speculated that a failure to appreciate the competitive nature of the software business may have led to the company's sudden collapse.

Monday, 9 AM — Microsoft Internal Mail

From: billg
To: mikem
Re: Food Program

Please see if you can reassign one of the 3000 engineers from the OS/2 virus development project to do a feasibility study on a food-related program. Not sure what it would do. Low priority.

The two most frequent changes to this document are the lowering of the number of the engineers working on the virus program from 3000 to 667, and the lowering of Bill Gates's personal investment from $250 to $75.

This document has not only achieved the status of folklore (NET-lore), but is already a classic. As with most folklore, the orientation is mostly satirical. The interesting aspect to electronic folklore is the easily editable nature of the document.

Still, there is enough respect for the authors of these gems to keep them mostly intact. While minor changes have been made over the life of this document, the humor has not been altered. There will be a lot of chuckles over the next decade as NET-lore goes into full swing. ■

© 1992 by John C. Dvorak. All rights reserved. *John C. Dvorak graduated from the University of California. He is a contributing editor of* PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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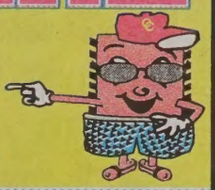

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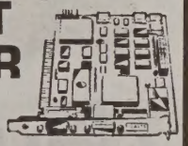

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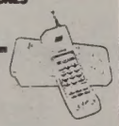

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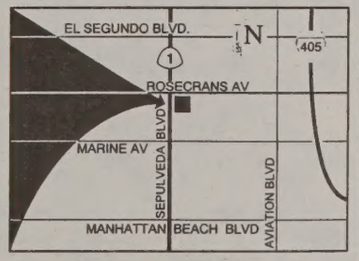


Even a *free* memory manager may not be a bargain—especially if it can't give you all the memory you need.

Introducing QEMM 7 The Memory Manager Worth Paying For

The newest version of QEMM, version 7, pioneers new ways of using the critical area between 640K and 1024K. It optimizes this area, taking into account the many drivers that need more memory at start-up than when running; instantly calculating millions of possible memory configurations to find still more memory for your applications, TSRs and utilities to use.

Instant Riches

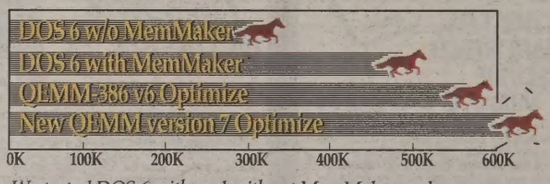
What does more memory mean in a practical sense? It means that your DOS and MS Windows programs run faster, smoother and more reliably. It means you can continue to add valuable utilities, drivers, TSRs and new capabilities to your PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC will have. QEMM 7 lets you have it all without fear of 'out of memory' messages or crashes.

DOS 6 Giveth; DOS 6 Taketh Away

The best feature of new DOS 6 is the stable of utilities it includes. Trouble is, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 7-45K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using MemMaker, you could easily lose—not gain— available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to cut memory demands for these utilities by up to 80%, ensuring that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting DOS 6's multiple configurations gives you the flexibility and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.)

How to Look a Gift Horse in the Mouth



We tested DOS 6 with and without MemMaker and QEMM6 and our new QEMM 7 runs away from all of them. See details of test conditions listed below.

Page Frame: the Key to Your Future

There's been a lot of jealous talk about our patent-pending Stealth technology. Nobody else can duplicate its 48-115K gains.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame lets Lotus 1-2-3 r2.x run larger spreadsheets and WordPerfect 5.x larger documents. It's also used by DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games for fast action. You sacrifice all this when other memory managers turn off the page frame. Stealth saves you room to set up your PC with a mouse, CD ROM, sound board, a network such as Novell NetWare, create 8-24K of extra memory for optimal MS Windows performance, use all of DOS 6's memory-hungry utilities and still have more than 630K to run applications smoothly and safely.

Prior versions of QEMM won just about every competition in sight, as well as remaining the #1 best-selling memory manager 5 years straight.

Put Your Money on a Winner QEMM 7

The new and ever more exciting capabilities coming to your PC will all compete for memory with your favorite applications, TSRs and drivers. And that makes QEMM 7 the most vital utility you can own.

Our seventh-generation memory manager is a thoroughbred that helps you get the most out of your PC today and tomorrow.

Quarterdeck

How we got the chart numbers CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0,0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM. ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

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